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bulletin of
Duke University
1997-98

Information and Regulations

Trinity College of Arts and Sciences
The School of Engineering



The Mission of Duke University

The founding Indenture of Duke University directed the members of the university to "develop our resources, increase our wisdom, and promote human happiness."

To these ends, the mission of Duke University is to provide a superior liberal education to undergraduate students, attending not only to their intellectual growth but also to their development as adults committed to high ethical standards and full participation as leaders in their communities; to prepare future members of the learned professions for lives of skilled and ethical service by providing excellent graduate and professional education; to advance the frontiers of knowledge and contribute boldly to the international community of scholarship; to foster health and well-being through medical research and patient care; and to promote a sincere spirit of tolerance, a sense of the obligations and rewards of citizenship, and a commitment to learning, freedom, and truth.

By pursuing these objectives with vision and integrity, Duke University seeks to engage the mind, elevate the spirit, and stimulate the best effort of all who are associated with the university; to contribute in diverse ways to the local community, the state, the nation, and the world; and to attain and maintain a place of real leadership in all that we do.

The Fundamental Standard

Undergraduate students in Trinity College and the School of Engineering comprise a major constituency of the Duke University community. Admission to this *community of scholars* is a privilege, not a right, and it is expected that its members will adhere to the fundamental standards of honesty, integrity, and respect for the rights of others. Failure to meet these standards may be sufficient cause for dismissal from the University.

Duke University Undergraduate Honor Code

An essential feature of Duke University is its commitment to integrity and ethical conduct. Duke's honor system helps to build trust among students and faculty and to maintain an academic community in which a code of values is shared. Instilling a sense of honor, and of high principles that extend to all facets of life, is an inherent aspect of a liberal education.

As a student and citizen of the Duke University Community:

- I will not lie, cheat, or steal in my academic endeavors.
- I will forthrightly oppose each and every instance of academic dishonesty.
- I will communicate directly with any person or persons I believe to have been dishonest. Such communication may be oral or written. Written communication may be signed or anonymous.
- I will give prompt written notification to the appropriate faculty member and to the Dean of Trinity College or the Dean of the School of Engineering when I observe academic dishonesty in any course.
- I will let my conscience guide my decision about whether my written report will name the person or persons I believe to have committed a violation of this Code.

I join the undergraduate student body of Duke University in a commitment to this Code of Honor.

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Duke University does not discriminate on the basis of race, color, national and ethnic origin, handicap, sexual orientation or preference, gender, or age in the administration of educational policies, admission policies, financial aid, employment, or any other university program or activity. It admits qualified students to all the rights, privileges, programs, and activities generally accorded or made available to students. For further information, contact the Office for Institutional Equity at (919) 684-8222. Duke University has adopted procedures for investigation and remedy of complaints involving harassment. See the Harassment Policy Statement, p. 23.

Information that the university is required to make available under the Student Right to Know and Campus Security Acts may be obtained from the Office of University Relations at 684-2823 or in writing at 615 Chapel Drive, Duke University, Durham, NC 27708.

This publication may be accessed online at: <http://www.duke.edu/web/bulletins/regulations/>

Duke University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, Georgia 30033-4097; Telephone number 404-679-4501) to award baccalaureates, masters, doctorates, and professional degrees.

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University Calendar, 1997-98

Fall, 1997

August	
27	Wednesday—Orientation begins; assemblies for all new undergraduate students
September	
2	Tuesday, 8:00 A.M.—Fall semester classes begin
15	Monday—Drop/Add ends
26-28	Friday-Sunday—Homecoming
28	Sunday—Founders' Day
October	
10	Friday, 7:00 P.M.—Fall break begins
15	Wednesday, 8:00 A.M.—Classes resume
17	Friday—Last day for reporting midsemester grades
24-26	Friday-Sunday—Parents' Weekend
29	Wednesday—Registration begins for spring semester, 1998
November	
18	Tuesday—Registration ends for spring semester, 1998
19	Wednesday—Drop/Add begins
26	Wednesday, 12:40 P.M.—Thanksgiving recess begins
December	
1	Monday, 8:00 A.M.—Classes resume
11	Thursday, 7:00 P.M.—Fall semester classes end
12-14	Friday-Sunday—Reading period
15	Monday, 9:00 A.M.—Final examinations begin
20	Saturday, 10:00 P.M.—Final examinations end

Spring, 1998

January	
14	Wednesday—Registration and matriculation of new undergraduate students
15	Thursday, 8:00 A.M.—Spring semester classes begin
28	Wednesday—Drop/Add ends
February	
27	Friday—Last day for reporting midsemester grades
March	
13	Friday, 7:00 P.M.—Spring recess begins
23	Monday, 8:00 A.M.—Classes resume
April	
1	Wednesday—Registration begins for fall semester, 1998, and summer, 1998
16	Thursday—Registration ends for fall semester, 1998; summer registration continues
17	Friday—Drop/Add begins
29	Wednesday, 7:00 P.M.—Spring semester classes end
30	Thursday—Reading period begins
May	
1-3	Friday-Sunday—Reading period continues
4	Monday, 9:00 A.M.—Final examinations begin
9	Saturday, 10:00 P.M.—Final examinations end
15	Friday—Commencement begins
17	Sunday—Graduation exercises. Conferring of degrees

University Administration

DUKE UNIVERSITY

GENERAL ADMINISTRATION

Nannerl Overholser Keohane, Ph.D., *President*

John W. Strohbehn, Ph.D., *Provost*

Ralph Snyderman, M.D., *Chancellor for Health Affairs and Dean, School of Medicine*

Tallman Trask III, Ph.D., *Executive Vice-President*

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Charles E. Putman, M.D., *Senior Vice-President, Research Administration and Policy*

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Gordon G. Hammes, Ph.D., *Vice-Chancellor for Medical Center Academic Affairs*

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David B. Adcock, J.D., *University Counsel*

N. Allison Haltom, A.B., *Secretary of the University*

William H. Willimon, M.Div., S.T.D., *Dean of the Chapel*

Trinity College

William H. Chafe, *Dean of Trinity College and Dean of the Faculty of Arts and Sciences*

Robert J. Thompson, Ph.D., *Dean of Undergraduate Affairs*

Lee W. Willard, Ph.D., *Assistant Dean for Planning and Special Programs*

Gerald L. Wilson, B.D., Ph.D., *Senior Associate Dean for Administration; Social Sciences and Pre-Law*

Martina J. Bryant, Ed.D., *Associate Dean for Social Sciences and Pre-Business*

Mary Nijhout, Ph.D., *Associate Dean for Natural Sciences and Pre-Graduate School Advisor*

Ellen W. Wittig, Ph.D., *Associate Dean for Humanities*

Caroline L. Lattimore, Ph.D., *Assistant Dean for Social Sciences*

Christa T. Johns, Ph.D., *Director of Foreign Academic Programs and Assistant Dean for Study Abroad*

Norman C. Keul, Ph.D., *Assistant Dean for Pre-Majors and Director of the Pre-Major Advising Center*

Kay H. Singer, Ph.D., *Assistant Dean for Natural Sciences, Director of Health Professions Advising Center*

The School of Engineering

Earl H. Dowell, Ph.D., *Dean*

Marion L. Shepard, Ph.D., *Associate Dean for Undergraduate Affairs*

Student Affairs

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Maureen D. Cullins, A.B., A.M., *Assistant Vice-President and Dean of Campus Community Development*

Suzanne Wasiolek, M.H.A., J.D., LL.M., *Assistant Vice-President*

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TBA, *Manager of Information Services*

Career Development Center

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John C. Barrow, Ed.D., *Director of Career Discovery Programs*

Laurence Maskel, Ph.D., *Director of International Programs*

Donna Harner, A.B., *Assistant to the Director, Career Specialist*

Delphinia Avent, B.A., *Career Librarian*

Ketti Klaber, A.B., M.A.T., *Career Specialist*

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Dian Poe, B.A., *Career Specialist*

Virginia Steinmetz, Ph.D., *Career Specialist*

Sandra M. Tuthill, *Career Specialist*
 Gail Williams, B.A., M.A., *Career Specialist*
Center For Lesbian, Gay, and Bisexual Life
 John A. Howard, Jr., M.A., *Director*
Counseling and Psychological Services
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 John C. Barrow, Ed.D., ABPP, *Assistant Director for Career Development, Groups and Outreach Education*
 Libby E. Webb, M.S.W., BCD, *Assistant Director for Clinical Services and Administration*
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 Carlisle C. Harvard, B.A., *Director*
 Stephanie Alt Lamm, M.A., *Program Coordinator*
Intercultural Affairs
 Julian B. Sanchez, M.Ed., *Director*
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Jeanine Atkinson, M.S., *Substance Abuse Specialist*
Lisa Barber-Murphy, M.Ed., C.H.E.S., *Health Education Specialist*
Deborah Pilkington, M.Ed., *Health Education Specialist*

University Life

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Peter Coyle, A.B., *Associate Dean*
Melinda Bolger, Ph.D., *Assistant Dean, Student Advising/Programming*
TBA, *Assistant Dean, Coordinator of Advising*
Krista Cipriano, B.F.A., *Assistant Dean, Director of the Craft Center*
Beverly Meek, B.S., *Assistant Dean, Coordinator of Marketing*

The Women's Center

Ellen Plummer, M.S.W., *Director*
Selden Holt, A.B., *Coordinator of Sexual Assault Support Services*
Elaine Allen, M.T.S., *Program Coordinator*





Student Services



A number of resources within the university are relied upon by undergraduate students for counseling and information relating to both academic and personal matters. In addition, the university provides a variety of services for students in areas such as health care and postgraduate employment. Some of these resources and services are available through the offices of the individual school and college; others are provided by university-wide offices and departments. For additional information consult the *Bulletin of Undergraduate Instruction*.

Administrative Offices of the School and College

TRINITY COLLEGE

The Dean of Undergraduate Affairs, Dr. Robert J. Thompson, Jr. The dean is responsible for programmatic development, maintaining the quality of the academic programs, and fostering teaching excellence in Arts and Sciences. The dean in conjunction with the dean of the faculty of Arts and Sciences recommends to the provost policies and budget needs concerning the undergraduate college in its goal to provide a distinguished liberal arts college experience within the context of a nationally competitive research university. The dean implements the policies and acts as chief budget officer in relation to them. The dean is assisted in executing these responsibilities by the associate dean of Trinity College and the academic deans.

The dean assists the Offices of Development and Alumni Affairs in their fund raising efforts for the university as a whole.

The Senior Associate Dean for Administration, Gerald L. Wilson. The senior associate dean for administration coordinates the work of the Trinity College staff and serves as its review officer in cases involving appeals on decisions of the academic deans of the college. The dean also serves on an appellate panel charged with hearing appeals of decisions rendered by the Undergraduate Judicial Board in academic dishonesty cases.

Associate Deans of Trinity College Martina Bryant, Mary Nijhout, Gerald Wilson, and Ellen Wittig. Assistant Deans of Trinity College Christa Johns, Norman Keul, Caroline Lattimore, and Kay Singer. The associate and assistant deans of Trinity College are often referred to as the students' "academic deans." In the college they are responsible for a wide range of activities. In general, the academic deans advise students about academic matters, careers, fellowships, preprofessional planning, Program II, foreign study, and any other issues of academic concern to students; supervise individual student's progress toward graduation and certify completion of degree requirements; administer and coordinate programs; provide information about programs, advising, policies, procedures, and regulations to faculty members requesting it; enforce academic regulations; serve on various Arts and Sciences Council,

university, and Trinity College committees; act as editors of, or as liaisons with editors of Trinity College publications such as the *Undergraduate Bulletin*; and perform other duties delegated by the dean of Undergraduate Affairs, or the senior associate dean of Trinity College.

A dean serves as director of the Pre-Major Advising Center for first-year students and for sophomores who have not declared a major. The other academic deans are divisional advisers—in the humanities, the natural sciences, and mathematics, and the social studies division—for all students who have declared a major. (See Administration of the College, above.) The relationship between these academic deans and the faculty advisers is a complementary one. Faculty advisers have primary responsibility for advising about major courses and requirements. The academic deans monitor graduation requirements, handle requests for exceptions, and deal with unusual academic problems and any change of status questions.

THE SCHOOL OF ENGINEERING

Dean Earl H. Dowell. The dean of the School of Engineering has overall responsibility for instruction and research in the school as well as for the educational experience and welfare of its students. The dean works with various constituencies including the university administration, faculty, students, and alumni on matters of general policy and delegates responsibilities within the school to members of his staff.

Associate Dean Marion L. Shepard. The associate dean has responsibility for academic matters pertaining to undergraduates, and for working with the academic departments in helping to establish student's programs of study. He counsels with first-year students before they arrive on campus, and through summer correspondence with them, assists in making preliminary selection of courses for the fall semester. He also plans and directs the orientation of the first-year students. Under his supervision, engineering faculty members serve as advisers to students. He approves leaves of absence, courses to be taken elsewhere, the dropping and adding of courses, academic probation, dismissal or withdrawal from the school, transfer into or out of the school, and similar matters. He serves as the dean's deputy in representing the school on campus, among alumni, friends, supporting industries, and governmental organizations. He also provides primary liaison with the Career Development Center.

FACULTY ADVISING

Apart from academic counseling of students by faculty members whom they come to know on an informal basis, faculty advising of undergraduates in Trinity College and the School of Engineering takes place in three primary ways. First, in Trinity College, faculty members serve in the Premajor Advising Center as general academic advisers to groups of first-year students and premajor sophomores and are available for individual conferences; second, in the School of Engineering, first-year students and sophomores are counseled by special faculty advisers before the students choose their department; and third, in all departments, the director of undergraduate studies and other faculty advisers are available to assist students concerning academic matters pertaining to their departments.

Student Affairs

Vice-President for Student Affairs, Janet Smith Dickerson, 203 Flowers. The vice-president for Student Affairs is an officer of the university and part of the president's cabinet. Working in close concert with the president and the provost, the vice-president for Student Affairs actively participates in the planning and implementation of policy with the goal of providing exemplary academic and co-curricular experiences for all

Duke students. The vice-president establishes and maintains the conceptual framework of the Division of Student Affairs. The vice-president is responsible for the health and welfare, residential and campus experience, and co-curricular activities of students. This responsibility is met through the work of the offices in the Division of Student Affairs and through collaborative endeavors with Trinity College, the School of Engineering, the Graduate School, the professional schools, the Chapel, the department of Athletics, and other departments of the university. A list and brief description of the offices in the Division of Student Affairs follow.

Counseling and Psychological Services, R. James Clack, Director, Suite 214, Page Building (CAPS). The CAPS staff provides a coordinated and comprehensive range of counseling and psychological services to meet the unique needs of students.

Services are available to all undergraduate, graduate, professional, and allied health students who pay the student health fee. CAPS is unable to provide off-site services for those students enrolled in programs outside the Durham area; however, we can consult with students and help them obtain the services they need. There are no additional costs for these services. CAPS services include evaluation and brief counseling/psychotherapy directed toward family, social, academic, and sexual issues. The professional staff is composed of psychologists, clinical social workers, and psychiatrists who are experienced in working with young adults. Individual, couples, and group counseling and psychotherapy are utilized in helping students resolve their concerns. Some CAPS staff, trained as professional career counselors, offer counseling for career indecision through the Career Development Center.

CAPS also offers seminars and groups focusing on personal development. Themes addressed by groups in the past have included coping with stress, understanding and enhancing relationships, and overcoming eating disorders. Support groups offered by CAPS have addressed the specific needs of student groups such as African-American students, graduate and professional students, and lesbian, gay, and bisexual students. New groups can be developed to meet student needs.

Another important function of CAPS is to provide consultation to the entire university community regarding student development and mental health issues. Offices with which CAPS has liaisons include the Career Development Center, Student Development, Student Health, Religious Life, University Police, The Duke Athletic Department, and the Women's Center. CAPS also provides consultation and programming for student groups such as resident advisors and other peer helper groups.

Standardized testing, including graduate and professional school admission tests such as the LSAT, MCAT, and GRE, is administered by CAPS.

CAPS maintains a policy of **strict confidentiality** concerning information about any student's contact. Such information can be released, however, with the student's specific written authorization. If appropriate, a referral may be made to other staff members or a variety of local resources including multidisciplinary mental health professionals in private practice and clinic settings.

CAPS offices are centrally located in Suite 214, Page Building, next to the Chapel on West Campus. Appointments may be made by calling 660-1000 Monday through Friday between 8 A.M. and 5 P.M. However, if a student's concern needs immediate attention, this situation should be made known to the secretary, and every effort will be made to arrange for a counselor to talk with the student immediately.

The Office of Campus Community Development, Maureen D. Cullins, Assistant Vice-President and Dean of Campus Community Development, 203 Flowers Building. The office provides advocacy and support to students who may face challenges based on their identities or interests through outreach and programming conducted by the Community Service Center, the Office of Intercultural Affairs,

International House, the Women's Center, the Center for Lesbian, Gay, and Bisexual Life, and the Mary Lou Williams Center. The National Pan-Hellenic Council sororities and fraternities are advised by this office.

Community Service Center, Elaine Madison, Director, Ground Floor, Crowell Hall, East Campus. The goal of the Community Service Center (CSC) is to serve the Duke and Durham communities and to advise students about service opportunities. The CSC is an umbrella organization for more than thirty student-led service groups. Additionally, the CSC coordinates the Duke Service Corps in which Duke students can choose to earn their work-study allotments through community internships. Both a clearinghouse for volunteer opportunities and a programming body, the CSC sponsors a variety of educational events throughout the school year. In order to integrate service, reflection, and academic work, the center also sponsors a number of house courses that address social justice issues and experiential education.

The University Center for Lesbian, Gay, Bisexual Life, John A. Howard, Jr., Director, 211 Flowers Building. The University Center for Lesbian, Gay, and Bisexual Life (Center for LGB Life) provides multiple services to undergraduate, graduate, and professional students on lesbian, gay, and bisexual issues. The services include: (1) a safe haven to discuss issues of sexuality as it relates to self, family, friends, and others; (2) a friendly and comfortable location for lesbians, gays, bisexuals, and allies to socialize and discuss issues affecting the lesbian, gay, and bisexual community; (3) a place for groups to meet and organize activities; (4) a resource center and library containing magazines, books, and information by, for, and about lesbians, gays, and bisexuals; and (5) advocacy on lesbian, gay, and bisexual matters at Duke. Through these services, the Center for LGB Life presents opportunities for people to challenge homosexuality and intolerance and to create a more hospitable environment for lesbians, gays, and bisexuals at Duke. The services and programs offered by the Center for LGB Life are available to all students interested in lesbian, gay, and bisexual issues.

International House, Carlisle C. Harvard, Director, 2022 Campus Drive. International House serves as the center of cocurricular programs for internationals and US Americans interested in other cultures and peoples. As part of the Division of Student Affairs, the mission of International House is: *(1) to assist internationals and their families in becoming acclimated to Duke and Durham, enabling them to benefit fully from their time at Duke, and (2) to promote interaction through programming and community outreach for the mutual enrichment of the internationals and US Americans at Duke and in Durham.* In 1996/97 there were over 1000 international students from 89 countries enrolled at Duke. Programs include: **Orientation Week** for graduate and professional students; a **Pre-Orientation Day** for international undergraduates; **International Friends Program** which pairs interested internationals with local families or individuals to promote friendship and cross-cultural learning; **Duke Partners** which pairs internationals with US Americans for weekly conversation and language exchange; **Speakers' Panorama** which provides schools, civic organizations, and community groups with speakers from around the world; **World Game**, a half day experiential program which simulates the structure of global problems, resource distribution, and political connections on a huge map and encourages participants to address these issues; **Friday Coffee Hours** (sponsored by Campus Ministry and held at noon in the basement of Duke Chapel), a time for people of all nations to come together for refreshments and conversation; **Cross Cultural Training** for groups interested in developing awareness and skills needed to manage cultural diversity at both interpersonal and organizational levels; and the **International Association**, a student-run group that sponsors culture nights, trips, sports teams, and an annual campus-wide International Festival. For more information,

e-mail: ihouse@acpub.duke.edu or access on the web: www.stuaff.duke.edu/deptpages/ccd/I-House/

The Office of Intercultural Affairs, Julian B. Sanchez, Director, 107 Union West. The Office of Intercultural Affairs holds responsibility for identifying and assisting with changes in the Duke University community which promote optimum growth and development for African-American, Asian-American, Latino-American, and Native American undergraduate and post-baccalaureate students. The office conducts such activities as public forums on student life, mentorship projects with university alumni, seminars on current issues for students of color, institutional research on student of color development, and serves as a resource for issues involving students of color and diversity for the university community.

The Office of Religious Activities, William H. Willimon, Dean of the Chapel. The dean of the Chapel and a combined staff of twenty-two are responsible for providing a diversity of ministry which takes seriously Duke University as a pluralistic religious community. This broad ministry includes services of worship (both in Duke Chapel and in other locations at the university), programs of religion and the arts, opportunities to develop caring and serving communities, and opportunities to respond to critical social issues. Chaplains and campus ministers are also available for individual counseling with students and others in the university community.

The Office of University Life, Susan Coon, Dean, 101-3 Bryan Center. University Life is committed to excellence in education through programming, advising, and services in the arts, entertainment, and recreation, which are integral to university and community life.

University Life has an advising component, which serves Duke Student Government, recognized student organizations (undergraduate and graduate) and the University Union.

The office serves as a liaison between the university administration and student groups, clubs, and organizations. The office offers workshops and other instructional and programmatic aids to promote the development of leadership, technical, and organizational skills within student groups. The office also provides financial record-keeping assistance and training.

The Event Advising Center (EAC) is designed to help students cut through the red tape of event and program planning. The EAC will assist and advise student leaders who are planning bands, speakers, trips, conferences, receptions, and other events. The EAC is staffed by graduate students who work with the Advising Team of University Life deans.

Registration of events, as required by the Alcohol Policy, and based on location, sound amplification, and other factors, takes place at the Event Advising Center.

The University Union brings students together to stimulate, promote, and develop the social, recreational, cultural, and educational activities of the Duke University community. The Union sponsors a broad range of programs, including lectures, concerts, recreational activities, fine arts presentations, and exhibits. Also available are creative opportunities such as the Craft Center, original film producing, and the campus' radio station and closed-circuit cablevision broadcasting system.

University Life manages such events as the Duke Artists Series, the Chamber Arts Society Series and the Summer Festival of the Arts. It schedules Page Auditorium and directs the use of the hall.

The Duke University *Yearly Calendar* is published and distributed from the office. In order to avoid conflicts, all campus events should be recorded at University Life as early as possible.

The Office of Student Development, Barbara A. Baker, Dean, Suite 200, Crowell Hall, East Campus. This office works with the Duke student body in a variety of ways

and is concerned with creating a residential community supportive of a solid educational experience. It advises individual students regarding personal problems, houses undergraduates in the residence halls, and assists students to plan and present educational and cultural programs within the residence halls. One-hundred twenty resident advisors (RAs), who are staff members of the Office of Student Development, reside in the residence halls and are directly responsible for the administration of the student residences and their programs. They also are available for counseling students and/or referring them to the various personnel services which provide specialized advice or counsel. First-year student advisory counselors (FACs), who are upperclass men and women selected for qualities of responsibility and leadership, work through the Office of Student Development. Members of the FAC program are assigned to a small group of first-year students and, during orientation, welcome their groups and help to acquaint them with the university. Judicial affairs are handled through the office by coordinating and applying the general rules and regulations of the university as well as working with all participants involved in the judicial process and coordinating the student advising system. The Office of Student Development also works with transfer students and the Transfer Committee, and advises student residential living groups and their governing bodies.

The Women's Center, Ellen Plummer, Director, 126 Few Federation. The Women's Center, located across the traffic circle from the Allen Building, works to promote the full and active participation of women in higher education at Duke by providing advocacy, support services, referrals, and educational programming on gender-related issues. Women's Center programs and services address a wide variety of issues, including leadership, safety, harassment, health, campus climate concerns, personal and professional development, and the intersection of gender with race, class, and sexual orientation. The center seeks to assess and respond to the changing needs of the university community, to raise awareness of how gender issues affect both women and men on campus, and to serve as an advocate for individuals and groups experiencing gender-related problems, such as sexual harassment or gender discrimination.

The center offers programming internships to undergraduate and graduate students; houses a feminist lending library; and publishes *VOICES*, a semesterly magazine addressing issues related to gender, ethnicity, and sexual orientation on campus and in the wider community. Additionally, the center advises and serves as a meeting place for student groups addressing gender issues on campus, including the Women's Coalition, BASES (a student-to-student mentoring program for first-year women), Students for Choice, WISE (Women in Science and Engineering), GPWN (Graduate and Professional Women's Network), and the Panhellenic Council. Open Monday through Friday 8:30 A.M. - 5 P.M., the center invites students to study in its lounge or browse through its library during business hours and makes its space available for student group meetings and programs in the evenings. Call 684-3897 for more information.

The Women's Center also houses Duke's **Office of Sexual Assault Support Services** (Selden Holt, Coordinator), which provides 24-hour-a-day support and crisis counseling to female and male students who are survivors of rape or sexual assault, incest, relationship violence, child sexual abuse, or attempted assault. Information and assistance are also available to friends, partners, and family members of survivors. SASS sponsors Safe Haven, a preventive program in which two trained volunteers staff the Women's Center from 11 P.M. to 7 A.M. on Friday and Saturday nights. Safe Haven can be used by women who need a safe place to make a call, wait for a ride, or receive first aid or other crisis assistance. Additionally the SASS office advises student groups such as DARE (Duke Acquaintance Rape Education) and sponsors peer support groups,

public events, and educational programming on sexual assault and related issues. For information or assistance, Call 684-3897 (administrative number) or 681-6882 (crisis line).

Student Health Services

Student Health Service, William A. Christmas, M.D., F.A.C.P., Director, Hanes House. The Student Health Service is an office of student affairs and is administered by the Department of Community and Family Medicine, Duke University Medical Center. Medical services are provided by board-certified family physician faculty, physician assistants, and nurse-practitioners.

DUKE FAMILY MEDICINE CENTER (684-3180), located in the Pickens Building on the corner of Erwin Road and Trent Drive, is the primary location for medical care. Students are seen by appointment Monday-Friday, 8:00 A.M. -5:30 P.M., Saturdays from 12:00 noon - 2:30 P.M., and Sundays from 1:00 P.M. - 3:30 P.M. Weekend hours are subject to change. A wide variety of services are available:

Primary care services for injury and illness	Travel Advice/Immunizations
Health promotion/disease prevention services	X-rays
Gynecologic care	Cold/flu/allergy self-help table
Health education	Allergy and immunizations
Sports physical therapy	Nutrition counseling
Laboratory	Pharmacy

In order to allow coordination of health care, students should use the Duke Family Medicine Center as their portal of entry to other health resources, including the specialty clinics at Duke University Medical Center, when needed.

EAST CAMPUS WELLNESS CLINIC (613-1111), 109 Wilson House, is located at the Union-Wilson Arcade. Walk-in hours are 8:00 a.m. - 4:30 p.m. Monday through Friday. The cold/flu/allergy self-help table, condoms, and literature covering a variety of physical and emotional issues is available. The staff nurse provides medical advice assessment, and information.

For problems arising after hours during the academic year, students should call the Infirmary (684-3367). The nurse may advise the student to come to the Infirmary or to the Duke Emergency Department (684-2413) for further evaluation and possible consultation with the physician on call. In the event of a life-threatening emergency, students should go directly to the Emergency Department in Duke Hospital North. If necessary, Duke Police Department (911 or 684-2444) will provide on-campus transportation to the Emergency Department or the Infirmary.

THE INFIRMARY (684-3367), located on the fourth floor, purple zone of Duke University Hospital-South Division, is open 24-hours-a-day during the academic year and provides inpatient treatment of illnesses too severe to manage in the residence hall or apartment, but not requiring hospitalization. It also provides a 24-hour DIAL-A-NURSE phone line for advice, a cold/flu/allergy table, and walk-in triaging. The Infirmary is accessible from the Main Entrance of Duke South 24-hours-a-day, as well as from the entrance at the West Campus Main Academic Quad, M-F 6am-8pm, Sat-Sun 7am-6pm. The Infirmary is closed during the summer and winter recesses.

HEALTH EDUCATION. Health education staff assists students in making informed decisions regarding their health at the Healthy Devil Health Education Center, Room 101, House O, Kilgo Arch, 11 A.M.-2 P.M., Monday -Friday, 684-3620, ext. 325 (walk in or by appointment) and at Health Education Administration, Duke Family Medicine Administrative Suite, 146 Trent Hall.

Services, Information, and Counseling Include:

- Nonprescription cold, flu, allergy medications (Healthy Devil, Duke Family Medicine Center, Duke South Infirmary)
- Safer sex
- Contraception
- Sexually transmitted diseases, including HIV/AIDS
- Alcohol and drug related issues
- Nutrition and weight management
- Eating disorders
- Stress management
- Women's health issues

PHYSICAL THERAPY SERVICES. Student Health Physical Therapy is located on West Campus, in the basement of Card Gym. A physical therapist is available from 2:00-5:00 P.M. weekdays, on a walk-in basis, to assess exercise-related problems, and to outline short-term treatment plans to aid recovery and help prevent re-injury.

COUNSELING AND PSYCHOLOGICAL SERVICES (660-1000) is a complementary service to the Student Health Service. Mental health and career counseling services are available, as detailed in the CAPS section of this bulletin.

HEALTH FEE. All currently enrolled full-time students and part-time degree candidates are assessed a student health fee. This covers most services rendered within the Student Health Service during each enrolled semester. A description of services covered by the health fee is in the literature distributed to all entering students. An optional summer health fee for students not enrolled in Summer Session but registered for upcoming fall classes is available through the Office of the Bursar.

HEALTH INSURANCE is essential to protect against the high cost of illnesses or injuries which require hospitalization, surgery, or the services of specialists outside the Student Health Service. All students are required to have such insurance. For those not adequately covered by other insurance, the Duke Student Insurance Plan is specifically designed to complement the coverage provided by the student health fee. Coverage for the student's spouse and dependent children may be purchased. This insurance covers students both on and off campus, throughout the one year term of the policy. International students are required to show proof of health insurance coverage (either the policy offered by Duke or comparable coverage) and may not assume responsibility for personal payment of health care cost.

Policy Regarding Medical Excuses.

Students who have missed examinations or deadlines for assignment because of documented illness or authorized representation of the university off-campus may receive an official excuse ("Dean's Excuse") or approved extension from their academic dean. Dean's Excuses are not issued for absences from class, discussion sessions, or laboratories, only for missed course work as defined above. This change in policy has been made in part in response to a request from the Student Health Service (SHS), which has seen an alarming increase in the number of students seeking a medical appointment simply to document medical conditions that may have resulted in missed classes. The SHS will, of course, continue to treat all students with illnesses and, based on the severity of the case, may provide verification of "temporary disability due to illness or injury" for use by the academic deans in determining whether a Dean's Excuse is appropriate for course work missed. Regarding class attendance, the *Bulletin of Undergraduate Instruction* (p. 45) states that:

Responsibility for class attendance rests with the individual student, and since regular and punctual class attendance is expected, the student must accept the consequences of failure to attend. Instructors may refer to the student's academic dean a student who is, in their opinion, absent excessively.

The circumstances under which Dean's Excuses can be issued are, as a rule, "only for illness certified by a medical official of the university or for authorized representation of the university in out-of-town events." In all other circumstances, including absences from classes, students should discuss their situation with the instructor, who is the person best positioned to evaluate a request for accommodation in the context of the course.

Confidentiality. Information about a student's physical or mental health is confidential and can only be released with the student's permission. This policy applies regardless of whether the information is requested by university officials, friends, family members, therapists, or physicians not involved in the student's immediate care.



IMPORTANT TELEPHONE NUMBERS

Scheduling Appointments at Duke Family Medicine Center: 684-3180

East Campus Wellness Clinic: 613-1111

Student Health Service Administration: 681-3069

Student Infirmary: 684-3367

Health Education: 681-3069

For Emergency Transportation (University Police) day or night

On campus: Duke Police: 684-2444

Off campus: Durham Ambulance Service, Durham telephone: 477-7341

All students receive a description of the Student Health Service with their bursar's bills as well as the services covered by the student health fee. Additional copies of this information are available at Duke Family Medicine Center and the Office of Student Development.

Department of Housing Management

Fidelia Thomason, Director, 218 Alexander, Apartment E. The Department of Housing Management, an Administrative Services Division auxiliary, is responsible for residence hall and apartment facilities on East, West, Central, and North Campuses. The department has responsibility for the following services: physical maintenance of the residential buildings with work performed by the Facilities Management Department in the residence halls and Housing Management in the apartments, custodial care of the residential facilities, key issue and control (rooms and buildings), storage of personal effects, and control of furniture and equipment. Housing Management is also responsible for all summer assignments and graduate student academic year assignments in Central Campus Apartments. Business matters related to residential fees and rents come under the purview of the department. Residence hall and apartment business matters should be discussed with the Housing Administration Office, 218 Alexander, Apartment B. Questions about a student's facility service needs should be discussed with the residential area service office: West I, 101R House D, 684-5486, for residents of main West Campus except Few; West II, House VOO, 684-5559, for residents of Few, Edens, and Trent; for residents of East Campus, Brown-Union Arcade, 684-5320; and 217 Anderson Street, 684-5813, for residents of Central Campus.

Office of Alumni Affairs

Laney Funderburk, Director, 614 Chapel Drive. The Alumni Affairs Office initiates and sponsors a variety of activities and services linking Duke students with one of the university's best resources its alumni. Students are encouraged to take advantage of DukeSource and the Conference on Career Choices, thereby strengthening student-alumni relationships. These two programs are administered by the Career Development Center.

The class pictorial directory for first-year students, one of the university's most closely read publications, is sponsored by the Duke Alumni Association and published by Alumni Affairs. Many get-togethers are planned for new and current students, both on and off campus. Also, the Alumni Office staff assists the undergraduate class officers in planning activities and promoting projects.

The president of DSG and undergraduate class presidents serve on the Board of Directors of the Duke Alumni Association and its committees. *Duke Magazine*, published bimonthly by Alumni Affairs, is offered by subscription to parents of students.

Career Development Center

John H. Noble, Director, Page Building. The mission of the Career Development Center (CDC) is to educate the students of Duke University in the arts of self-assessment, career exploration, career planning, and job hunting with the goal of helping them develop rewarding and fulfilling careers. The center primarily serves the students and alumni/ae of Trinity College, the School of Engineering, and the Graduate School.

Career counselors are on staff helping students early in their lives at Duke to begin the process of discovering career interests. Career specialists then help students focus on specific career fields, including business, education, engineering and computer science, health and life sciences, government and public sector, public and community service, and media and the arts. Career specialists also work closely with the faculty and deans of Trinity College in directing students' interest towards effective application to graduate and professional schools.

Programs and services of the center include the Ventures Internship Program offering semester-long internships in local area businesses, the Health Careers Internship Program offering experiences at the Medical Center and elsewhere in Durham, the Service Learning Project offering stipends for summer work in community service, the Hospital School Tutors Program providing teaching opportunities, the On-Campus Recruiting Program offering interviews for summer and permanent positions with a wide variety of national organizations, and the Credential Service which collects and sends letters of recommendation.

News This Week, a regularly published online newsletter, is designed to keep students constantly aware of career-related opportunities on- and off-campus. Announcements of job openings, career seminars, workshops, and information sessions are announced each week. The Career Library and J.O.B. Room provide a wealth of printed and database materials on specific career fields and specific employers. DukeSource is the center's group of thousands of alumni/career advisors from all over the country and overseas who have volunteered to help Duke students find out more about specific career fields and job-hunting strategies within those fields.

The CDC website provides information at computer clusters located throughout the university. A student may review bulletins, information about the center, summer and full-time job listings, and register to participate in center programs 24-hours a day.

Academic Information



Miscellaneous Academic Policies and Procedures

PROCEDURE FOR RESOLUTION OF STUDENTS' ACADEMIC CONCERNS

Trinity College provides formal educational opportunities for its students under the assumption that successful transmission and accumulation of knowledge and intellectual understanding depend on the mutual efforts of teachers and students. Ideally, the college offers a range of learning experiences in which students strive to learn enough to be able to test their ideas against those of the faculty, and faculty, through the preparation of course materials and the freshness of view of their students, discover nuances in their disciplines.

Sometimes, however, student-faculty interrelationships in certain courses give rise to concerns that, for whatever reason, can inhibit successful teaching and learning. When this occurs students often need assistance in resolving the issues.

The faculty and administration of Trinity College attempt to be genuinely responsive to all such matters and a student should not hesitate to seek assistance from faculty and administrative officers in resolving problems.

Questions about course content, an instructor's methods of presentation, the level of discourse, criteria for evaluation of students, or about grades or administrative procedures in a course, should be directed to the instructor of the course. If a student believes that productive discussion with the instructor is not possible, courtesy requires that the instructor be informed before the student refers questions about the course to the director of undergraduate studies or, in his or her absence, to the chairman of the department. If a student's concern involves a departmental policy rather than an individual course, the student should first confer with the director of undergraduate studies in the department. A list of the names, addresses, and telephone numbers of the various directors of undergraduate studies can be found in the *University Directory*. Staff members in the department offices can assist in arranging appointments with the directors. When necessary, directors of undergraduate studies may refer students to the department chairman.

A student in doubt about how to proceed in discussing a particular problem, or who seeks resolution of a problem, is encouraged to confer with an academic dean of Trinity College.

In those exceptional cases where a problem remains unresolved through informal discussion, a formal procedure of appeal to the dean of Trinity College is available. A student may initiate this more formal appeal procedure by bringing his or her problem—with assurance of confidentiality, if requested—to the attention of the dean of Trinity College, who will request information about the nature of the issue and about the earlier efforts made to deal with it.

Duke Harassment Policy

Harassment of any kind is not acceptable at Duke University. It is inconsistent with the university's commitments to excellence and to respect for all individuals. Duke University is also committed to the free and vigorous discussion of ideas and issues, which the university believes will be protected by this policy. For the full statement of the policy, see p. 62.

A member of the Duke University community who believes that he or she has been harassed in violation of the Harassment Policy is encouraged to take action in any of the ways described on p. 64. Although no informal activities are required before an individual may file a formal complaint, the Duke University Harassment Policy favors informal resolution of harassment claims whenever such resolutions can be effected fairly.

For description of possible informal resolutions and of the process for initiating a formal complaint, see p. 64.

Residential Information



Residential Facilities

TRINITY COLLEGE

THE SCHOOL OF ENGINEERING

The university adheres to the premise that social regulations and activities of the various living groups must be supportive of the general welfare of the total university community and must be protective of the interests of individuals and minority viewpoints within each living group. Most of these regulations are enforced by the members of the community. In addition to the social regulations formulated by each living group, there are certain policies specified by the university that apply to students living within the residence halls and pertain to the safety and security of students and the orderly functioning of the residence halls. Within the framework of the regulations of the community, individual students are responsible for their own decisions and choices. Any student or group of students may recommend a change in the regulations by presenting a proposal to the Dean's Advisory Committee, an advisory committee to the Office of Student Development on matters of housing.

The residential facilities of Trinity College and the School of Engineering are available to all full-time single undergraduate students who have been in continuous residence since their matriculation as first-year students as well as to students on leaves of absence or off-campus, provided they have filed the appropriate papers by established deadlines in the Office of Student Development. Duke University residential facilities include residence halls and Central Campus Apartments. While every undergraduate who matriculates as a first-year student is guaranteed four years of university housing so long as he/she remains a full-time student, he/she may live in university housing for no more than four years. Students who enroll in graduate or professional programs prior to receiving the undergraduate degree (such as "three/two" programs) are not eligible for undergraduate housing during their fifth year.

First-Year-Student Residence Halls. First-year students reside in all first-year student houses, the majority of which are coed, located on East Campus. The housing assignments are made by random lottery to the houses. Within the residence halls, single, double, and triple rooms are available.

Beginning with the Class of 1999, undergraduates will be required to live on-campus three years.

Upperclass Residence Halls. Upperclass students live in coed and single-sex residence halls on West and North Campuses and Central Campus Apartments. There are two types of living groups: independent lottery and selective. The independent living groups have their spaces filled by a general housing lottery. The selective living groups, which include the fraternities, select their members. Included among the selective houses are academically sponsored theme houses such as the Decker Tower Language House; the Mitchell Tower Arts House; the Round Table; and the Anne Firor Scott Women's Studies House. Other selective houses include Spectrum, a multicultural theme house, the Women's Selective House (Cleland), and SHARE. All living groups or houses are governed by House Councils elected by members of the groups. Within all of the upperclass houses, except those located in Edens, there are triple as well as single and double rooms.

Central Campus Apartments. Located on Central Campus is a complex of university owned and operated apartments which accommodates nearly 800 undergraduate students. The remainder of the complex houses a cross-section of graduate students from various schools and colleges of the university. This facility is part of the undergraduate lottery space, and assignment to this space satisfies the university's guarantee to provide eight semesters of housing.

The House Council

The House Council is the primary governing and programming body responsible for building a sense of community within the living group. The house council shall be comprised only of resident members of the living group, and the leadership shall consist of the following officers: president, treasurer, communications coordinator, and other officers as outlined in the house constitution. Each House Council is required to submit an updated/revised constitution to the Office of Student Development by October 1 of each academic year. Failure to do so will result in financial accounts being frozen and/or the loss of the privilege to register events.

To provide adequate funding for house programming, each resident is required to pay duly agreed upon house dues. (Please refer to the House Dues Policy)

The Quadrangle Council

The Quadrangle Council is the primary governing and programming body of the quadrangle. The council is responsible for building community within the quad through the dual roles of programming and governance. The primary purpose of the quad council is to promote a greater feeling of community between houses within the quadrangle. A council, composed of one member from each living group, will be formed to fulfill these responsibilities. In the case of smaller quadrangles, two members of each living group may be elected. Each quadrangle will have the following officers: president, treasurer, and communications chair. Quadrangle officers may not be executive members of their respective house councils nor the voting house representative to the Quadrangle Council. Each Quadrangle Council is intended to function as a team. Members of the quad councils should act both as leaders and team members. Therefore every event sponsored by the quadrangle council shall have a project leader, and the other members of the committee shall serve as team members for that project.

To provide adequate funding for quad programming, each resident will pay quadrangle dues ranging from \$15 to \$40 per semester as determined by the quad during the preceeding year. These dues shall be assessed to the bursar's account during the spring semester. (Please refer to the section Quadrangle Dues.)

The Campus Council

While the primary purpose of the quadrangle system will be to increase intellectual and social community within the residence halls, the primary purpose of the Campus Council will be to support and provide direction for residential life. Each quadrangle council will select three representatives to serve on the Campus Council. Each type of house within the quadrangle should be represented, thus each quadrangle will select one Greek, one independent, and one selective non-Greek representative. In addition, three representatives from Central Campus and three East Campus representatives shall serve on the Campus Council.

An executive committee from the Campus Council, the Residential Policy Committee, shall serve as an advising committee to the dean of Student Development on pressing issues. The committee shall be composed of one representative from each upperclass quad represented on the Campus Council. In addition, three members from the East Campus Council shall serve on the Dean's Advisory Committee.

Residential Regulations

(See also Student Life Section for additional information.)

In its residential policies and procedures, Duke University seeks to foster a climate of responsibility, initiative, and creativity on the part of individuals and living groups.

A successful residential community is one in which students take pride in their physical surroundings and assume active responsibility for the maintenance of acceptable standards of public behavior in their living areas. **Living groups are held accountable for the actions of individual members.**

While students are entitled to a general expectation of privacy within the confines of their own individual rooms (although, of course, extraordinary and compelling circumstances may occasionally require that this expectation be institutionally suspended), the university will not regard either students' immediate living quarters or their commons areas as privileged sanctuaries where students may act with absolute impunity and without regard to minimum standards of civility, decency, and respect for the rights of other members of the university community. Moreover, occupancy of an individual room or of a residence hall does not confer any proprietary interest or right of ownership on the part of the living group as a whole. The student and the living group are both properly viewed not as *owners* but as *custodians* of that living space (with all of its physical amenities) which has been assigned to them. Inherent in this custodial relationship, of course, is the right of the university to promulgate criteria governing the circumstances under which this relationship may be entered into, may be maintained in good standing, or may be terminated.

While the majority of problems incurred between or among roommates can be resolved by the students, with or without assistance, there are some cases in which a stalemate occurs. The Office of Student Development will, in those cases, reserve the right to convene an arbitration panel to resolve the problem. The decision of the panel is final.

Residence Hall's Security Systems. All residence halls are locked twenty-four hours a day. Residents have access by using their DukeCards. Other Duke students have access to all those living groups which have voted such access between the hours of 9:00 A.M. and 2:00 A.M.; otherwise, access is gained by use of telephones which are installed at the front door of each living group. *DukeCards are not to be loaned or borrowed.*

Signing Out. There is no requirement that a student leave a record of his or her whereabouts if he or she leaves the Duke campus. However, in order that students can be located when needed in an emergency and in the interest of students' safety, it is recommended that students leave records of their whereabouts and anticipated time of return with the residential staff or with roommates when they are out of the residence hall.

Use of Residential Common Space. Recognized living groups at Duke University are afforded the privilege of common space for social, educational, and recreational purposes. Given that many Duke-recognized organizations are in need of space in which members can come together to conduct business and celebrate accomplishments, any living group is encouraged and permitted to allow other university-recognized organizations to reserve its common space with the understanding that the living group to which the space officially has been assigned bears ultimate responsibility for any damage to the facility by the user. **NO** rental fees may be charged by a living group to another organization requesting use of the living group's common space. Living groups, however, may require an up-front damage deposit, not to exceed \$200. A living group should be aware that any event host requesting the use of its common space is required to register the event in accordance with guidelines published by the Event Advising Center. If the event is approved, the registration form includes an acceptance of responsibility by the event host for any damage committed to the facility stemming from the host group's event. Any charges billed to a living group will be deducted from the host group's deposit or, should charges exceed the deposit, the host group will be

required to reimburse the living group the difference. If no charges are assessed a host group, the living group must refund the entire deposit. If a living group has reservations concerning a specific request for the use of its common space, it may exercise its right to deny the request.

Guests. A student may not have guests over the objection of his/her roommate(s). Students may have overnight guests for reasonable periods of time, typically not to exceed a 72-hour time period, contingent upon the approval of his/her roommate(s). However, continued use of a residence hall room or Central Campus Apartment by person or persons other than those to whom the room or apartment is rented is prohibited. Overnight guests should not be entertained during examination periods. The colleges reserve the right to ask a guest to leave if university policies and residence hall regulations are not obeyed or if complaints are received from members of the residential community. Violation of any of these regulations could lead to nonresidents being charged with trespassing and residents (both guest and host) having their housing licenses revoked.

HOUSING LICENSE

Prior to occupancy of space in a university residence hall or Central Campus Apartment, each student must sign a housing license. Licenses for the residence halls and Central Campus Apartments must be filed with the assistant dean of housing in the Office of Student Development. Refer to the appendices for copies of the residence hall license and the Central Campus housing license.

REVOCATION OF THE HOUSING LICENSE

Residence hall occupancy should be understood as a privilege which is to be maintained under certain standards. This includes abiding by the terms of the housing license as well as upholding general standards of civility, decency, and respect for the rights of other members of the university community.

All terms of the housing license (see Appendix A for copies of the residence hall and Central Campus licenses) are designed to protect the health and safety of students and to provide for the comfort and privacy of students who have contracted to occupy university housing.

Any conduct which reflects a serious disregard for the rights, health, safety, and security of other occupants of university housing will be reason for revocation of this license and/or disciplinary action. Such conduct includes, but is not limited to, tampering with fire and security equipment or use/possession of firearms, weapons (including starter pistols), and explosives (including fireworks). When a license is revoked due to disciplinary action, the university will not refund any portion of the payment for the semester in progress.

In addition to violators of specific housing license terms, a student who has been a repeated violator of housing terms and/or university regulations or who has shown blatant disregard for others is subject to eviction.

HOUSE DUES POLICY (Under review for 1997-98)

Duke University has a strong commitment to a residential community supportive of a good educational experience. The activities of each residential house which contribute to this experience are possible only through a financial commitment of the members of that house. Therefore, students living within a living group are obliged to pay the dues upon which the residents agree. First-year student dues are predetermined at \$35 per semester. (It should be noted that the university has taken this obligation into account when determining a student's financial aid package.)

1. It is required that house dues be agreed upon by at least a two-thirds majority vote of the living group membership in a well-announced meeting attended by at least three-fifths of the members or through a poll of all residents. Further, it is understood that this is a private matter between the individual and his/her living group. Each living group is required to set dues to a \$25 per person minimum for each semester. If house dues exceed the minimum, living groups must report the actual amount to the Office of Student Development by October 1 for the fall semester and by February 1 of the spring semester.
2. Students who move from one living group to another can expect a prorated refund from their former living group and are expected to pay prorated house dues to the new living group.
3. Students who have accepted membership in a particular living group in which they continue to reside and, at a later time, accept membership in another group shall be obligated to pay dues to both groups unless a written agreement is negotiated with the groups involved.
4. Independents involuntarily placed in fraternity sections, or in independent selective living groups, or fraternity men involuntarily placed in independent sections are not obligated to pay house dues. They may choose to pay social dues if invited to do so by the fraternity or the independent house; however, they are obligated to pay a small annual fee (\$10 per semester) if they use the commons room and television.
5. Should a selective living group be unable to fill its assigned space with its members, up to 10 percent of the space (with approval of the Office of Student Development) may be allocated to "affiliate" members who have a contractual financial arrangement with the selective group. Such persons pay dues and enjoy full social privileges within the selective group and often are referred to as "friends of the house."
6. On-campus house accounts may be opened through the University Life office.

ASSISTANCE FOR LIVING GROUPS IN COLLECTING DUES

The Office of Student Development will assist in collecting dues *only if* house treasurers submit to that office a list of those delinquent in payment along with their room numbers by October 3 for first semester dues and February 6 for second semester dues. The Office of Student Development will not assist in the collection of dues for groups that choose to maintain off-campus bank accounts, nor will the Office assist in the collection of living group dues which are used to purchase alcohol. In order to have the assistance of that office in collecting dues, house treasurers *must* attend the Student Affairs Workshop for house treasurers during the fall semester. Also, there must be a statement that the treasurer has personally contacted all students delinquent in paying dues.

Appeals. Every house must make available to all students the option of appealing in-house for a waiver of dues. It is recommended that appeals be heard in a closed meeting of the appellant and the house treasurer (and, perhaps, house president) with the resident adviser as observer and adviser. The contents and decision of such appeals are to be held in the strictest confidence. When a waiver is granted, it may be assumed, unless otherwise specified in the decision, that the appellant retains all social privileges in the house. The hearing panel may recommend full payment, installment payment, or nonpayment. All students must pay a fair-share portion of the damage fees. Decisions of the hearing panel may be appealed to the appropriate judicial body.

N.B. Joining a fraternity or a sorority, participating in other organizations, taking no interest in activities of the living group, or deciding to spend one's discretionary

funds in another way do not constitute valid grounds for exemption from paying dues.

Sanctions. Students failing to pay living group dues which have been properly established and whose names have been reported to the Office of Student Development by October 3 (fall) and/or February 6 (spring) will be subject to the following:

1. Graduating seniors and undergraduates who are continuing as students but are not planning to live in university housing will be referred for disciplinary action to the appropriate judicial body.
2. All other students will have their housing privileges revoked for the remainder of their undergraduate careers.

QUADRANGLE DUES (Under review for 1997-98)

In an effort to assist each quadrangle in the creation of a strong community identity through the development and implementation of effective programs, appropriate funding is essential. These dues will be charged directly to students' bursar's accounts. All quadrangle dues will be set by individual quadrangles at a rate between \$15-40 per semester. Individual quadrangles must make formal notification of dues for the following academic year to the Office of Student Development prior to spring break each year. Each quad council must submit a written statement outlining the results of the vote on quadrangle dues, including the names/signatures of all representatives present. Failure to submit this documentation will result in quadrangle dues remaining the same as the current academic year.



LIVING OFF-CAMPUS

Students above the first-year student level who wish to live off campus should file the appropriate forms with the assistant dean of housing, Office of Student Development.

If a student plans to live off campus and return to university housing at a later time, he/she *must* request by the deadlines published by the Office of Student Development that his/her housing deposit be held up to one calendar year, after which it would be refunded and the housing guarantee revoked. Such requests should be made by completing the appropriate form with the assistant dean of housing in the Office of Student Development.

NOTE: Students choosing to live off campus should be aware that they will be subject to all city ordinances, particularly those related to occupancy, noise, parking, and litter.

POLICY FOR REFUND OF RESIDENTIAL DEPOSITS, BOARD PAYMENTS, AND RENTS FOR STUDENTS IN UNIVERSITY HOUSING

Residential Deposits. The one hundred dollar (\$100) residential deposit paid upon matriculation to Duke will be refunded if the Office of Student Development is notified by the currently enrolled student prior to the last day of spring semester classes of his or her intent to move out of university housing for the fall semester and by November 1 if canceling for the spring semester.

Move from Residence Halls to Central Campus Apartments. Students who move from the residence halls to Central Campus Apartments will have their room rent payment credited to the Central Campus apartment rent and will receive full refund of unused board payment (unused points) if the board contract is terminated at the time of the residence hall cancellation. Students also have the option of maintaining or changing the board contract at this time.

Canceling a Central Campus or Residence Hall Assignment. Undergraduate students in Central Campus who wish to move off campus, move to the residence halls, take a leave of absence, or withdraw from the university should contact the Office of Student Development to request cancellation of the contract. Request for cancellation due to a leave of absence or withdrawal from the university will be granted. A request for cancellation to move off campus or to the residence halls will be granted only if an eligible replacement (eligibility is determined by the Office of Student Development) is found to move into the space created by the cancellation. If a student has been released from the housing license by the assistant dean of housing and is eligible for a refund of unused rent, the amount will be determined by the date of written notification or the date of vacating the apartment, whichever is later.

Undergraduate students assigned space in the residence halls who wish to cancel their assignments must notify the Office of Student Development in writing. Students who cancel their assignments after the contract has begun will be entitled to a refund of the unused rent, the amount to be determined according to the date keys are returned to the service office and/or the date Housing Management inspects the room and confirms that the space has been vacated. Refunds of unused board payment (unused points) will be given if the board contract is terminated at the time of room cancellation.

PRIVACY OF STUDENT'S ROOMS AND APARTMENTS

Students who reside in university residences are assured the privacy of their rooms and apartments and freedom from the admission into or search of their rooms or apartments by any unauthorized persons; however, the university is obligated to maintain reasonable surveillance of the residential areas to promote an environment

consistent with the aims of an academic community. To foster these conditions the following regulations are in effect:

1. Housing Management personnel may enter assigned rooms or apartments at reasonable hours on days designated by either bulletin board notices or similar prior notification for the purpose of carrying out their assigned tasks and functions. Other personnel may enter assigned rooms when accompanied by proper authorization from the appropriate administrative official (see section 2 (c) below). In the case of residence halls, this notification, when feasible, shall be posted on the residence hall bulletin board stating what dates rooms will be entered. Maintenance personnel may enter assigned rooms or apartments at reasonable hours for the purpose of carrying out their assigned tasks and functions. Housing Management personnel attempt to inspect the maintenance work done within twelve (12) working days to validate satisfactory completion of such work. Employees in the above categories may report on the condition of university facilities and equipment, on violations of the housing license, or on situations which jeopardize the overall health and safety of the resident population. All personnel in the above category shall leave written notice stating the purpose for entering. Upon receipt of this notice the occupant may contact the area Service Office to discuss the entry. The written notices must, as well, advise the occupant that subsequent investigation or repair may henceforth occur at any time during the normal work week of Housing Management or maintenance personnel. (Note: General rule or enforcement procedures will not be founded on information relating to the personal contents of rooms from personnel mentioned unless such contents are specifically prohibited by university regulations or by the housing license published in advance.)
2. No person, with the exception of those listed in section 1 above, shall enter assigned rooms or apartments except under the following conditions:
 - a. consent of the occupant(s); or
 - b. presentation of a properly drawn legal search warrant; or
 - c. authorization from the Office of Student Development; or
 - d. emergency situations or immediate threat to preservation of the building and the safety of occupant(s) and/or the residential population.
 - e. reasonable suspicion that criminal activity is occurring behind closed doors and no response by occupants (e.g., illegal use of drugs)
3. Reports made as a result of inspections related to physical facilities and/or furnishings will be handled by the Department of Housing Management in accordance with the existing residential regulations as published in bulletin form by the university.
4. Written authorization from the deans must specify the reasons for believing such a search is necessary, the objects sought, and the area to be searched.
5. The request for a search, if approved by the designated authorities, shall be kept in records with the authorization until the time of the student's graduation and shall be available to the student for examination. The records will be kept completely separate from the student's permanent record. Should the search figure in any trial proceeding within the university, the authorization shall be attached to the trial record; if no action is taken following an authorized search, notation of this fact shall be filed with the authorization. No action shall be taken in regards to objects found but not specified on the authorization of the search.

In the absence of a legally drawn search warrant, no general searches shall be conducted by university personnel except with the possession of the written

authorization of all these above-mentioned deans, stating the reasons for the search and the specified objects sought, or under circumstances deemed to be of extreme emergency by these deans or the officer on each campus in charge of maintenance.

CARE OF STUDENT RESIDENCES AND ADJACENT CAMPUS AREAS

Though limited custodial services for common use areas are available, a student is responsible for the care of his or her room or apartment and furnishings and is required, as a condition of occupancy, to keep the room or apartment reasonably clean and orderly. The university reserves the right for personnel to enter at reasonable hours to inspect the condition of any student's room or apartment in accordance with the current privacy policy.

Nails, screws, tacks, or adhesives on any walls or woodwork of the residence are prohibited. The utilities, wiring, locks, or screens should not be altered in any way. (See Housing License for more detailed information.)

Games and other activities which may damage lawns or shrubbery adjacent to residence halls or apartments are not permitted. Defacing or painting buildings and adjacent installations, sidewalks, trees, and shrubbery is prohibited.

No student shall enter custodial, utility, or maintenance spaces within the residence halls or apartments unless accompanied by university-authorized custodial or maintenance personnel. Use of roof areas is prohibited.

Complaints and requests pertaining to maintenance and services should be reported to the Service Office in the appropriate residential area.

Housekeeping services such as cleaning the bathroom, sweeping, mopping, vacuuming, and trash removal will be provided on weekdays during the academic year (excluding holidays) in common areas of the residence halls. Cleaning of individual rooms or apartments is the responsibility of the resident(s).

Living groups are expected to take responsibility for cleaning up after parties and other events that create extraordinary messes. Behavior requiring extraordinary cleaning may be subject to disciplinary action. Inasmuch as housekeeping time spent on extraordinary clean-up is time spent away from the normal duties of keeping the buildings clean, extraordinary clean-up may be deferred until such time as the normal housekeeping tasks are complete. Extraordinary cleaning is generally defined as clean-up of (1) excessive trash, (2) conditions that present hazards to people, furnishings, or buildings, such as broken glass, standing liquids, flammable trash and health hazards, and (3) other conditions that require unusual effort, such as removal of eggs, shaving cream, etc. A cleaning supplies closet has been designated for each living group's use. Members of the living group have 24-hour access to and responsibility for the cleaning equipment provided by Housing Management. Each closet contains a mop, mop bucket, broom, dustpan, soap, toilet tissue, Barf Clean, and trash bags.

All living groups are responsible for cleaning trash beyond the normal amount on the grounds adjacent to their residence halls. Failure to have the grounds cleaned after an event will result in a minimum charge of \$25 to be determined by the Facilities Management Department.

Extra trash containers are available from the Facilities Management Department by calling 684-3611 at least two days prior to the event.

Damage Policy. Students will be held responsible for damages that occur in their rooms and apartments. Living groups similarly will be responsible for damage to public areas, equipment, and furnishings, buildings, sidewalks, shrubbery, and lawns. Repair costs may be billed to the students in accordance with procedures established by the university. If living groups are found responsible for damages, sanctions may include an order to make full restitution. The Quad Council also may refer specific living groups for disciplinary and/or pecuniary sanctions.

STORAGE

During the academic year, Housing Management provides storage for empty boxes and luggage without charge in the area designated for each residence hall. Students should consult their service offices for information. All items placed in storage for the academic year must be removed prior to the last day of final examinations for the spring semester. Nonstudents and students residing off-campus may not store personal effects at any time in the residence hall storage rooms. Items placed in storage must have a Housing Management storage tag and be well marked with owner's name and permanent mailing address. Receipts given at time of acceptance must be surrendered by the student on withdrawal of storage items. Items left in storage rooms after the end of the term will be disposed of in the best interest of the university. Storage in Central Campus Apartments is available for a fee to qualifying residents. No free storage is available.

The Department of Housing Management provides space for storage of personal or group-owned items during the summer months on a fee paid basis and in approved areas only. Any personal effects or group-owned items left in the residence halls not in approved storage areas (including, but not limited to, common rooms, closets, and above-suspended ceilings) may be disposed of without notice or reimbursement to the owner. Designated closets have been made available to some living groups for storage of group-owned items such as file cabinets, party supplies, and fraternal material. These closets may not be used by members of the living groups for storage of personal possessions. Housing Management is not liable for damage to or loss of stored living group items except as the fee paid storage terms allow.

LIVING GROUP BUILDING IMPROVEMENTS AND RENOVATIONS POLICY

Alterations and/or renovations to residence halls by living groups must be approved by the director of Housing Management. Any living group wishing to make permanent or attached alterations, additions, or renovations to residence halls commons areas must submit plans, drawings, and other related information to the director of Housing Management for evaluation.

If approved, such alterations, additions, or renovations will be accomplished at the living group's expense. Housing Management will inspect the completed work to make sure approved materials and plans were used and that the quality of construction is acceptable. Any construction which does not pass inspection must be removed or corrected as directed by Housing Management and at the living group's expense.

Any changes of a permanent or attached nature not approved through official channels may be removed at the convenience of the university and subsequent repairs made at the group's expense.

Living groups may make nonattached additions to commons areas during the academic year without specific approval from Housing Management so long as certain conditions are met. Examples of nonattached additions include, but are not limited to, bars, pool tables, ping-pong tables, stereos, speakers, refrigerators, furniture, etc. Non-attached additions must be portable, functional, in good repair, nondamaging to the building, noninterfering with routine housekeeping/maintenance, and may not present any safety or health hazard.

During the academic year, should nonattached living group property fail to meet these conditions, Housing Management will notify the living group of its noncompliance and request that the living group take corrective action by a specified deadline. If the problem requires immediate attention or the living group fails to make the correction by the deadline, Housing Management will take whatever action it deems necessary to eliminate the problem and the living group will be charged accordingly.

Housing Management assumes no responsibility for damage to, or loss of, living group owned property.

ALL NONATTACHED LIVING GROUP OWNED ADDITIONS MUST BE REMOVED BY THE LIVING GROUPS AT THE END OF EACH ACADEMIC YEAR. All nonattached living group property left in the residence halls after May move-out will be considered abandoned and will be disposed of at the expense of the living group and without liability by the university. No attempt will be made to contact living group members to determine ownership or disposition of the property.

Living groups are encouraged to seek their facility manager's advice when considering nonattached additions.

EXTERIOR SIGN POLICY FOR RESIDENCE HALLS

Exterior building signs identifying a living group will be permitted only in the immediate area of the residence. The sign must be provided by the group and approved jointly by the director of Housing Management and the dean of Student Development. Only one sign per living group is allowed.

All such signs will be mounted on the buildings by Housing Management at no cost to the group. Requests for sign approval and mounting should be made in writing to the director of Housing Management and must include a sketch of the proposed sign, indicating proposed dimensions and colors, in ample time for approval before beginning to build the sign. Any repairs to existing signs must be approved by the director of Housing Management.

RESIDENCE HALL BENCH POLICY

Only approved living groups may place benches on university property. Benches will be permitted only in the area immediately adjacent to a particular residence unit. The bench may be put in place by the living group as long as the dimensions are no larger than 12' in length, and 5' in height from the ground, and 6' in depth. Benches may not be cemented in the ground. If existing benches cemented into the ground must be moved for any reason, they will be cut off at ground level and not replaced in concrete by the university. Any bench too large to move in one piece will be separated into manageable pieces and reassembled using existing lumber without reimbursement to the living group for damages. Every effort will be made to retain the integrity of each bench when it is necessary to move a bench; however, the university will not be responsible for repairing benches damaged as a result of a move. Living group benches may have to be moved temporarily (e.g., for Commencement or summer programming). The specific design, including sketches noting dimensions, and desired location of a living group's bench must be submitted in writing to the dean of students at least three weeks prior to the desired construction date. Approval for a bench must be received from the dean of Student Development and the university Fire Safety Director. All wooden benches must be sprayed with a chemical flame retardant approved by the OESO-Fire Safety Division prior to their being painted.

Living group benches are intended to serve as locations for relaxed social interaction, and house residents are expected to maintain them in good order, routinely making certain that damaged wood is replaced and fresh paint is applied as needed. Removal of the benches from their designated locations is not permitted. Such action only serves to lessen their structural integrity and places the health and safety of those moving these heavy objects in serious jeopardy. Additionally, benches placed in unauthorized areas disrupt the normal use of public areas and unreasonably divert university employees from their assigned duties for the retrieval or removal of these structures.

Individual residents, and potentially their living groups as well, will be subject to disciplinary action if they are identified as being responsible for moving benches. A living group has an obligation to deter its residents from tampering with the property of other residential houses, for a living group can be held accountable for the actions of its individual members. Disciplinary measures taken against students identified as participating in the relocation of house benches may include, but are not limited to, having their housing licenses placed in imminent jeopardy of revocation, being placed on disciplinary probation, and being assessed repair/replacement costs, should a bench be damaged. A living group found responsible as a cohesive unit may have its bench dismantled, and denial of the privilege to build a new bench may extend for a period of time not to exceed one calendar year. Should a living group be found responsible for the damage or destruction of another living group's property, the offending house should anticipate loss of its bench and the requisite replacement of the property it damaged or destroyed.

Questions regarding this policy should be directed to the Office of Student Development.

Biennial Review of Residential Groups

Review of residential groups shall be conducted for *selective* groups only and will be held on a biennial basis. The committee conducting the review shall be composed of seven members: four students and three faculty and administrative representatives. Two students must be appointed by the Duke Student Government, one by the Campus Council, and one by the Undergraduate Judicial Board. The faculty and administrators are to be selected in consultation with the Office of the Dean of Trinity College, the Office of the Dean of the School of Engineering, and the Office of Student Development.

Formal evaluation of selective living groups will take place every two years, but the process requires accountability each year and envisages that living group presidents will not bear the exclusive burden of representing their respective groups in the evaluation process. Accordingly, the following procedures and schedule shall be implemented over a four-semester cycle:

1. **Semester one:** Members of the Review Committee meet individually with house presidents and resident advisors (and, where possible, other house council members) to review the particular strengths and weaknesses of the house's first biennial report, submitted in spring 1997. The session focuses primarily on areas deemed still in need of improvement and emphasizes the importance of ongoing communication with the Committee, especially with regard to the area(s) targeted for special effort by the living group.
2. Each selective living group submits, by **Friday, 12 December**, an interim report of house activities to the Review Committee. This report, to be accompanied by a log of specific activities, should cover the spring 1997 and fall 1997 academic terms and should assess the group's efforts in accordance with each of the **Expectations and Criteria for Evaluation** (listed below).
3. **Semester Two:** The Review Committee assembles early in the spring 1998 semester to examine the collected interim reports. Committee members meet with representatives from individual houses in order to offer a preliminary evaluation and to discuss strategies for improvement in particular areas.
4. **Semester Three:** Before the arrival of fall break the Committee Chair checks in with each selective house president in order to assess the group's progress in areas of particular concern to the Committee.

Each selective living group submits its final report. This report, due **Friday, 11 December 1998**, should cover the academic year 1997-98 as well as the fall 1998 semester and should be accompanied by a log of specific activities and

programs undertaken during that period. The report must be signed by all house council members as well as by the resident advisor.

5. **Semester Four:** The Review Committee deliberates and completes its final evaluation of selective living groups. It announces its evaluations and recommendations by spring break.

EXPECTATIONS AND CRITERIA FOR EVALUATION

1. **Faculty Interaction:** Emphasis will be placed on a broad range of interaction, on a regular basis, between faculty and living group members. The widest possible variety of modes of interaction, in a variety of contexts and physical settings, will be considered. The emphasis of the review will be on the *quality of the interaction* between students and faculty and not on the simple quantity of contacts.
2. **Student-led Programming:** A “program” will not necessarily require an outside presenter. House programming begins with the sharing of the unique experiences and expertise of living group members themselves with one another. A living group should encourage its own members to offer informal presentations that reflect their varied talents, intellectual and personal interests, experiences in travel and work, etc.
3. **Cultural Programming:** This venue involves not simply inviting groups into the house to perform but also having members of the living group take collective advantage of cultural programs (concerts, plays, readings, lectures, films, etc.) on campus and in the city of Durham. Many events are completely free of charge, and free or subsidized tickets often are available for other events with a minimum of advance planning. Arranging for group attendance at these kinds of events, with faculty participation wherever possible, should be a real priority of all selective living groups.
4. **Educational Programming:** Under this category will fall all of those programs dealing with community-related issues of health (such as eating disorders, drug or alcohol abuse, sexually transmitted diseases), safety and security, academic integrity, and race and gender relations.
5. **Community Service:** Here the emphasis will be on community and service projects to which the living group as a whole, not just particular individuals within the group, commits itself. Ideally, a living group will undertake some kind of ongoing, sustained commitment to one particular project or organization as well as take advantage of a variety of *ad hoc* opportunities as they present themselves.
6. **Social Interaction:** These activities include all of those opportunities designed to help residents get to know one another better and to relax in informal social settings. A living group is urged to use its collective imagination and creativity constantly to search for new modes of social interaction and not to feel that its only recourse is to the tried and true (i.e., weekly bagel brunches). Great variety exists here!
7. **Quadrangle Participation and Leadership:** Here the emphasis will be on the extent to which, and the ways in which, the particular living group demonstrates in its various activities a concern for outreach to the other, particularly nonselective, houses within its quadrangle setting. What kinds of cooperative ventures has the group initiated and in what types has it participated? What has been the living group’s contribution to the intellectual, cultural, and social environment of the quadrangle as a whole?

JURISDICTION AND SANCTIONS

In the event that selective living groups receive an unfavorable evaluation, sanctions shall range from warning or probation all the way to dissolution of the living group. Specifically excluded from the body of sanctions tied to the evaluation process, however, will be the relocation of a living group to another part of the campus. Relocations shall be the result of the periodic rotation of all living groups a procedure independent of the formal process of biennial review.

Although the formal evaluation of living group judicial records is no longer part of the review process, the Committee has determined that only selective houses with an unblemished judicial record for the period under review will be eligible for its highest rating of Outstanding.

For more information concerning the biennial review process, please contact Dean Benjamin Ward in the Office of Student Development.

Living Group Accountability for Community Standards

Living groups are responsible for maintaining standards established by Duke University. Selective houses, most especially, have an obligation to take proactive measures to insure that individual members conduct themselves in a mature, respectful manner, for being afforded the opportunity to select those persons who will live within a particular house is a privilege, not a right.

In situations where the actions of living group members negatively impact a Quadrangle and the quad council is unable to resolve the conflict, the appropriate administrator in the Office of Student Development may initiate disciplinary action, including calling for a hearing panel to determine whether a living group should be dissolved. A sanction of dissolution may be appealed to the vice president for Student Affairs, whose decision shall be final and binding.

The final decision regarding the continuation of any living group rests solely with Duke University.

It is important for living groups, as well as for any university-recognized cohesive units, to understand that **they can be held accountable for the actions of individual members**. This responsibility is a significant one, and in cases where a hearing officer or hearing panel is seeking to determine if corporate responsibility exists, the following questions will be considered:

- 1) How many members were involved? Should individuals be charged instead of, or in addition to, the group?
- 2) Were group funds used to support the activity?
- 3) Was the activity promoted by the group? Was it announced at meetings or advertised to group members?
- 4) Was the group/group leadership aware of the activity? If not, should the group leadership have been aware of the activity or of the potential for the activity to occur? If, however, members of the group anticipated or were certain of a particular activity, should steps have been taken to prevent it, or could the leadership have intervened to halt the activity?
- 5) Was there a public perception that the group was supportive of the activity?

These questions should serve to guide groups and their elected officers as they make all decisions, particularly those situations in which they are planning to host social events for themselves and/or guests. Groups found in violation of university policy may be subject to sanctions including, but not limited to, "formal warning," "disciplinary probation," "social suspension," "dissolution," or assessed restitution charges, assigned community service hours, or required to present educational programs.

Housing Policies for Selective Living Groups and Their Members

The following housing policies for selective living groups are gathered together from the February 26, 1981, Report of the Student Affairs Trustee Committee in response to the residential life section of *Directions for Progress*; "Social Fraternal Organizations Policies and Procedures, Duke University, July 1, 1979;" and "Residential Life: Policies and Procedures for Undergraduate Students, 1985-86."

Duke University will not recognize or charter a new fraternity unless there is adequate space to house the members as a living group.

In accordance with the guidelines adopted by the trustees in 1981, there is to be no greater number of fraternity living groups chartered. Furthermore, there is a 50 percent ceiling on the number of upperclass bed spaces on campus allocated to men and women's selective living groups (the number of selective bed spaces for men would be no more than 50 percent of the upperclass men's spaces on campus). Contact the Office of Student Development for further information.

POLICIES REGARDING SPACE ALLOCATED TO AND FILLED BY SELECTIVE LIVING GROUPS

1. All selective living groups are expected to fill 100 percent of their allocated bed space with initiated members.
2. If a selective living group fails to fill 100 percent of its section's bed space with members, but does fill 90 percent or more of its bed space with members, the following rules apply:
 - a. the Office of Student Development may elect to use any open spaces to house members of other selective living groups;
 - b. if the Office of Student Development does not elect to fill vacancies with members of other selective living groups, the selective living group may fill its unoccupied spaces with "friends of the house;" i.e., independent students who, upon mutual agreement, choose to live in the selective living group.
3. Selective living groups that fail to fill 90 percent of their allocated bed spaces with members may be subject to reallocation of any or all empty bed spaces to other students, relocation of the selective living group to a smaller house, or loss of recognition as a selective living group.
4. Should the number of members exceed the space in the allocated section, excess membership (to be determined by the living group) would find it necessary to be assigned to: (1) space available in another selected house, or (2) space available in an independent house or Central Campus apartment. A third option would be to move off campus.
5. Each selective living group is to submit to the Office of Student Development on November 15 and February 8 a list of eligible members who will be requesting housing in the allocated space for the subsequent semester.

POLICIES AFFECTING INDIVIDUAL MEMBERS OF SELECTIVE LIVING GROUPS

1. All members of selective living groups are bound to a two-year requirement to live within the selective house. Residents who break the two-year minimum requirement, yet wish to remain on campus, may elect to enter either the residence hall or Central Campus lottery but will be provided the lowest priority after rising sophomores. Semesters taken "on leave of absence" or study programs away from Duke will not be considered in violation of the two-

year commitment and will be counted as part of the two-year commitment. Students may elect to move off campus without penalty, unless they request to come back to live on campus.

2. Members of selective living groups unable to live in their section because there are more members than beds, must either be assigned space in another selective living group with available space, accept space in an independent house, or move off campus. Those students moving off campus have the option of retaining their residential status if they arrange with the Office of Student Development to have their housing deposits held for reinstatement when housing space within the living group section becomes available.

GUIDELINES FOR SELECTIVE LIVING GROUPS

1. Selective living groups should adopt and maintain at least one charity, volunteer commitment or service project that is uniquely their own.
2. Selective living groups should run a satisfactory level of cultural and educational programs each semester.
3. Selective living groups should maintain strong intramural sports and social programs, and whenever possible, look to interact with different groups on campus.
4. All selective living groups must maintain their status as active members of their respective quadrangle councils.
5. Selective living groups should choose a member of the Duke faculty or administration who agrees to serve as the living group's advisor.
6. If, after review, a selective living group terminates a student's membership in the house, then that student may reenter the regular lottery without penalty. Review and any terminations are to be completed no later than February 8, to facilitate the administration of the spring lottery.



Student Life



The Fundamental Standard

Undergraduate students in Trinity College and the School of Engineering comprise a major constituency of the Duke University community. Admission to this *community of scholars* is a privilege, not a right, and it is expected that its members will adhere to the fundamental standards of honesty, integrity, and respect for the rights of others. Failure to meet these standards may be sufficient cause for dismissal from the University.

The Undergraduate Community

Duke University expects and requires of all its students full cooperation in developing high standards of scholarship and conduct. Each student, in accepting admission, indicates his/her willingness to subscribe to and be governed by the rules and regulations of the university as currently in effect or as are put into effect from time to time by the appropriate authorities of the university.

Responsibility for prescribing and enforcing rules and regulations governing student conduct rests ultimately with the Board of Trustees of Duke University and, by delegation, with administrative officers of the university and of the college and school. In the undergraduate college and school, as well as in the university as a whole, many of these rules have been established over the years by cooperative action between students and administrative officers, and in the case of some rules, with participation of faculty members as well. The inclusive set of rules and regulations governs acceptable academic and nonacademic undergraduate student behavior. The enforcement of this set of rules has traditionally been a cooperative endeavor of students, faculty, and administrative officers, who have participated in reviews and have advised college and university officers about appropriate standards and procedures in such matters.

The judicial structure of the several university communities formalizes the tradition of shared participation by their members. Its viability is dependent upon a mutual recognition by all members of the community of the need for high standards of scholarship and conduct, a willingness to exercise the personal and corporate responsibilities that accompany such recognition, and an appreciation of the different roles and responsibilities played by various members who participate in the life of the community. In addition to the agreed upon monitoring and enforcement procedures, the university administration reserves the right to intervene as needed.

The Judicial Code of the Undergraduate Community

Students in Trinity College and the School of Engineering constitute an undergraduate community whose members are subject to the Undergraduate Judicial Code. Violations of the code and certain university regulations are adjudicated before the Undergraduate Judicial Board, composed of representatives of the student body, the faculty, and the administration. The constitution of the board and the procedural safeguards and rights of appeal guaranteed to students are set forth in Appendix B. Also provided is an alternative procedure for having cases adjudicated by a dean or administrative panel from the student affairs staff. The judicial code which follows was drafted and approved by the Judicial Review Committee during the 1980 spring semester and amended during the spring semesters, 1982, 1983, 1988, and 1996.

All officers of Duke University and those to whom their powers may be formally delegated are bound by laws of North Carolina and those of the United States. The

university is not an island. Students, faculty, administrators, and trustees alike are subject to state and federal laws. Acceptance of admission to the undergraduate school or college of this university carries with it the assumption of a sense of responsibility for the welfare of the community. Also assumed are obligations on the part of each individual to respect the rights of others, to protect the university as a forum for the free expression of ideas, and to obey the laws of the state and nation.

Acts in violation of North Carolina and United States law are necessarily in violation of the Undergraduate Judicial Code. Such acts when committed on university premises are within the cognizance of the Undergraduate Judicial Board unless otherwise expected. When committed off the university premises, they may fall within the board's jurisdiction if constituting a direct or indirect threat to the university community, whether or not the offense results in action by a regular civil or criminal court.

Proceedings under the Judicial Code of the Undergraduate Community before, during, or after any which may occur in the regular state or federal courts do not subject a student to "double jeopardy" because such jeopardy arises only in criminal law proceedings. Governments alone, not the university, enforce the criminal law. Action by the board or other university agencies enforce the terms under which a student has accepted admission to Duke University and all sanctions imposed relate to a student's status at the university.

Although the laws of North Carolina and the United States are incorporated in the Judicial Code, enumerated below and included in the following section on university regulations and policies are common infractions lying within the jurisdiction of the undergraduate judicial system. Complaints of alleged violations of these regulations and policies must be filed by members of the university community within two (2) calendar years of the alleged infractions. Conduct found to be in violation of the code is punishable by sanctions contained in Appendix C, Art. IV (K) of this bulletin.

I. Academic Dishonesty

- A. Plagiarism:** Expropriation of words, phrases, or ideas of another without attribution for the benefit of one who engages in the act of expropriation. (See "Use and Acknowledgment of Sources" in this bulletin.)
- B. Cheating:**
 - 1. Obtaining access, without the instructor's permission, to an examination question or questions prior to the instructor's distribution of the examination.
 - 2. Copying or attempting to copy during an examination from a resource not authorized by the instructor.
 - 3. Without the instructor's permission, collaborating with another, knowingly assisting another or knowingly receiving the assistance of another in writing an examination or in satisfying any other course requirement(s).
 - 4. Committing fraud on a record, report, paper examination, or other course requirement to be submitted to or in the possession of an instructor.
 - 5. Submission of multiple copies of the same or nearly similar papers without prior approval of the several instructors involved.
- C. Academic Contempt:** In the satisfaction of any course requirement, failure to adhere to an instructor's specific directions with respect to the terms of academic integrity or academic honesty for that course requirement.

II. Assault and/or Battery

- A. Battery: Any use of physical force against a person without his or her consent.
- B. Assault: Any threat of the immediate use of any degree of unauthorized physical force or an attempt to use such force which threatens or gives rise to a reasonable apprehension of force against the person threatened as perceived by that person. (See also "University Regulations and Policies: Harassment and Hazing.")
- C. Sexual Assault
 - 1. Sexual Assault I. By stranger or acquaintance, rape, forcible sodomy, forcible sexual penetration, however slight, of another person's anal or genital opening with any object. These acts must be committed either by force, threat, intimidation or through the use of the victim's mental or physical helplessness of which the accused was aware or should have been aware.
 - 2. Sexual Assault II. By stranger or acquaintance, the touch of an unwilling person's intimate parts (defined as genitalia, groin, breast, or buttocks or clothing covering them) or forcing an unwilling person to touch another's intimate parts. These acts must be committed either by force threat, intimidation or through the use of the victim's mental or physical helplessness of which the accused was aware or should have been aware.

III. Taking, Converting, and Selling

- A. Theft I: Any physical taking and carrying away of the personal property of another without the rightful owner's consent with a result of depriving the owner of its use.
- B. Theft II: Any physical taking and carrying away of community property with a result of depriving the community of its use.
- C. Larceny: Any physical taking and carrying away of the property of another without the rightful owner's consent and with an intention to convert it to the use of the taker and into the taker's own property or to convert it to the use of and ownership of a third party.
- D. Embezzlement: Fraudulent conversion of another's property by one to whom the owner entrusted it.
- E. Fencing: Knowingly receiving or concealing stolen property.

IV. Property Damage: Any damage to real or personal property owned by others, including that owned by Duke University, especially fire equipment, as well as that owned by members of the university community or by visitors to the university. (See "University Regulations and Policies: Fire Equipment" and "Care of Student Residences and Adjacent Campus Areas.")

V. Breaking and/or Entry

- A. Breaking: Any bodily action or attempt by means of such bodily action intended to create an opening for access to real or personal property without consent of the owner of such property.
- B. Entry: Any physical bodily presence within real or personal property without consent of the owner. Such illegal entry includes trespass on unauthorized areas. (See "University Regulations and Policies: Roof and Ledge Areas, Unauthorized Access.")

VI. Disorderly Conduct

- A. Any action, committed without justification or excuse, that unreasonably

disrupts the normal public use of public areas, or that substantially disturbs the peace and order of the university community. (See University Regulations and Policies: "Alcohol Policy," "Noise," and "Duke Computer Usage.")

- B. Any grossly unreasonable and reckless conduct in the handling of things or substances ordinarily regarded as inherently dangerous or capable of becoming dangerous to other persons or to their real or personal property.

VII. Fraud

- A. Any intentional misrepresentation of fact in an attempt to induce another to surrender a right or property or to authorize the conferring of a benefit in reliance upon the misrepresentation.
- B. Forgery or alteration of documents, including course examinations, papers, or other required exercises, in an attempt to obtain a right or benefit or property.
- C. Obtaining a right or benefit or property under false pretenses.
- D. Unauthorized misuse of otherwise valid documents.

VIII. Bribery: The offering, giving, receiving, or soliciting of any thing of value to influence action.

IX. Attempt: Attempting any unlawful act specified in this code by undertaking the intended action.

X. Contempt

- A. Failure to comply with directions, orders, or commands of any university judicial or police authority, or any academic or administrative official of the university acting in an official capacity.
- B. Knowingly furnishing false information to any such authority or official of the university acting in an official capacity.

XI. Illegal Possession

- A. Any transporting to or storing on the campus or possession of firearms, weapons, explosives, mace, or fireworks. (See "University Regulations and Policies: Fireworks, Other Explosives and Weapons.")
- B. Any violations of the university's alcohol or drug policy.

XII. Accessory to Commission of a Prohibited Act: Aiding through action or negligence, abetting, or otherwise acting as an accomplice to the commission of any prohibited act.

XIII. Conduct which is not specifically articulated in Articles I-XII, but which is adjudged by the appropriate authorities of the university to be in violation of the fundamental standard because it is inappropriate, disruptive, or detrimental to the university.

University Regulations and Policies

Students should be familiar with the Judicial Code of the Undergraduate Community and with the following regulations and policies of the university. Violations are matters which are subject to adjudication before the Undergraduate Judicial Board.

Alcohol Policy

INTRODUCTION

Moderate consumption of alcohol has given pleasure to people since ancient times and learning its proper use is a common part of the developmental process. It is appropriate, therefore, for the university to play a guiding role in that process. Duke's alcohol policy has been formulated to promote two purposes:

1. To allow Duke undergraduates who choose to drink the opportunity to use alcohol in social settings in congenial, moderate, and nondestructive ways.
2. To permit social events at Duke in compliance with state laws governing alcohol use to the extent possible. The need for strict control arises, in part, from the fact that the majority of undergraduates are not of legal age to purchase, possess, or consume alcohol.

This alcohol policy does not speak to activities which occur off the Duke campus. Although the university expects its students to conduct themselves responsibly in all settings, this policy focuses on activities that can be controlled reasonably and effectively by campus agencies.

NORTH CAROLINA STATE LAW REGARDING ALCOHOL

For complete information regarding North Carolina state laws governing alcohol, one should consult North Carolina General Statutes, Chapter 18B. Some highlights are excerpted below.

It is illegal for anyone less than 21 years of age to:

- **Possess beer or unfortified wine:**
Penalty-If 19 or 20 years of age, this offense is an unlawful act which carries no conviction and has no legal consequences other than a fine of \$25. If 18 years of age or younger, however, it is considered a misdemeanor which will become a matter of public record as a criminal conviction and subject one to court costs and/or fines.
- **Purchase or attempt to purchase beer or unfortified wine:**
Penalty-If 19 or 20 years of age, and if the violation occurred while the person was purchasing or attempting to purchase an alcoholic beverage, this offense will carry a fine of \$25. If 18 years of age, and if the violation occurred while the person was attempting to purchase an alcoholic beverage, this offense will be a misdemeanor resulting in court costs and/or a fine and, upon conviction, the Department of Motor Vehicles (DMV) will revoke the defendant's driver's license for one (1) year.
- **Use or attempt to use, in order to obtain alcoholic beverages when not of lawful age, a fraudulent or altered driver's license; or a fraudulent or altered identification document other than a driver's license; or an identification document other than a driver's license issued to another person:**
Penalty-If convicted, this offense is a misdemeanor resulting in court costs and/or a fine and the DMV will revoke the defendant's driver's license for one (1) year.
- **Permit (aid or abet) the use of one's driver's license or any other identification document of any kind by any person under 21 to purchase or attempt to purchase or possess alcohol:**
Penalty-If convicted, this offense is a misdemeanor resulting in court costs and/or a fine and the DMV will revoke the defendant's driver's license for one (1) year.

It is illegal for anyone (regardless of age) to:

- **Aid and abet an underage person in the sale, purchase, and/or possession of alcohol (including giving alcohol) :**

Penalty-If under 21 years of age, this offense will be a misdemeanor punishable by a fine of up to \$500 or imprisonment for not more than six (6) months or both, and upon conviction, the DMV will revoke the defendant's driver's license for one (1) year.

DEFINITIONS

Alcoholic Beverage-any beverage containing at least one-half of one percent (0.5%) alcohol by volume, including beer, wine, liquor, and mixed beverages.

(BYOB) Bring-Your-Own Beverage Event-any event requiring registration at which individuals bring beverages only for their personal consumption.

Common Container-any keg, large bottle, punch bowl, trash can, cooler, refrigerator or other device used for storing or mixing a quantity of beverage or from which a quantity of beverage is distributed to or consumed by more than one person.

Event-a party, concert, or other group social gathering held on the university campus attended by undergraduates.

Malt Beverage-a beverage containing at least one-half of one percent (0.5%) and not more than six percent (6%) alcohol by volume.

Public Space-all locations other than student's private rooms or apartments, including, but not limited to, common rooms, hallways, restrooms, balconies, quadrangles, courtyards, benches, classrooms, athletic facilities and sidewalks. Additionally, if two or more private rooms or apartments are designated such that people are moving back and forth between them, the entire area shall be considered a public space.

Sale of Alcohol-any transfer, trade, exchange or barter, in any manner or by any means for consideration of alcohol (e.g., cover charges, mug/t-shirt sales, etc.).

Spirituos Liqueur or Liqueur-distilled spirits or other alcohol and mixtures of cordials and premixed cocktails in closed containers for beverage use regardless of their dilution.

Unfortified Wine-wine with an alcohol content of not more than 17 percent.

Use of Alcoholic Beverages-possession, consumption, distribution, purchase, sale, or transfer of alcoholic beverages.

GENERAL PROVISIONS TO THE CONSUMPTION OF ALCOHOL

1. The use of alcoholic beverages is permitted only by those of legal age to drink and in accordance with North Carolina law governing alcoholic beverages.
2. All persons consuming alcohol must carry a valid driver's license, Special Identification Card for Nonoperators issued by North Carolina DMV, military identification card, or passport.
3. **No Kegs** will be permitted in private rooms or apartments.
4. There shall be **NO** alcoholic beverages in first year houses.
5. The use of alcoholic beverages in games (e.g., quarters, drink-offs) is prohibited.
6. The use of alcoholic beverages as a prize in a contest, drawing, lottery, etc., is prohibited.
7. Violations of this policy by groups and/or individuals shall be subject to disciplinary action.

ALCOHOL DISTRIBUTION IN PUBLIC SPACE

1. Undergraduate students and their respective living groups and organizations may not distribute alcohol in public space on the Duke campus. Public space includes all locations other than students' private rooms or apartments. Public areas include, but are not limited to, common rooms, hallways, restrooms, balconies, quadrangles, courtyards, benches, classrooms, athletic facilities, and sidewalks. Additionally, if two or more private rooms or apartments are designated such that people are moving back and forth between them, the entire area shall be considered a public space.
2. Only university approved bartenders, who will be responsible for carding, are permitted to distribute alcohol.
3. Except at events in a licensed facility providing a cash bar, no spirituous liquor or fortified wines may be served to undergraduates.
4. Food and alternative beverage must be available for the duration of the event.
5. All students consuming alcohol at a distribution event must carry a Duke Card. (In facilities equipped with on-line computer capabilities, the Duke Card shall serve as your valid form of ID.) Non-Duke students must carry a valid form of ID as stated above in the General Provisions.

BYOB

1. Alcohol may not be brought in glass containers to BYOB events that require registration.
2. Individuals are permitted to carry alcohol in a quantity deemed reasonable for their personal consumption during a four-hour period of time.
3. All individuals consuming alcohol must carry a valid ID. (See General Provisions above.)
4. No common containers will be permitted. (See "common container" under definitions.)

HEALTH AND SAFETY INTERVENTION

Because health and safety of student is of primary importance, students are encouraged not only to look out for their own health and safety but also for that of their peers who are present at the event. When a person's health and/or safety is threatened or appears to be in jeopardy, immediate action should be taken to prevent injury/illness/danger. The action may be a call to the infirmary (684-3367) for assistance in handling a minor illness or a call to Duke Police (911) for assistance in transporting a student to the Emergency Department. Whatever the particular need/problem, it is important to respond in a responsible and timely manner. There will be an automatic referral made for that individual to see the substance abuse specialist. However, information obtained during the delivery of medical treatment (including the actual transport of a student to obtain treatment) will not be used to bring disciplinary action under the Alcohol Policy against that individual or against a group or members of a group who assist the student in obtaining medical treatment, provided that the student/group *has not* violated any other (non-alcohol) university policy.

ENFORCEMENT

Reporting and enforcement of the Alcohol Policy will be a cooperative effort between Duke Police Department and the Office of Student Development. Duke Police may periodically patrol the residence halls. It also should be noted that resident advisors and area coordinators serve as administrative agents of the Office of Student

Development and will be expected to enforce this policy. The dean of Student Development reserves the right to implement additional monitoring measures as s/he deems appropriate. Failure to abide by the policy will result in disciplinary action.

SANCTIONS

Sanctions may include, but are not limited to, those listed below. In determining an appropriate response to violations of the Alcohol Policy, every attempt will be made to tailor a sanction to the physical/educational needs of the individual student or cohesive unit.

Any time a referral is made to the substance abuse specialist, s/he will be permitted, at her/his discretion, to require a student to seek counseling, to prepare and present an educational program to members of the community, or to be assessed professionally by an agency such as the Duke Alcoholism and Addition Program (DAAP).

I. INDIVIDUALS

A. Violations

Category I. Underage Possession/Consumption and General Provisions Violations (including aiding and abetting an underage person in the sale, purchase, and/or possession of alcohol).

*Category II ** Impaired or Disorderly+

It shall be a violation of the Alcohol Policy to be impaired and disorderly in any of the following ways:

1. Blocking or lying across or otherwise preventing or interfering with access to or passage across a thoroughfare, or
2. Grabbing, shoving, pushing, or fighting others or challenging others to fight, or
3. Cursing or shouting at or otherwise rudely insulting others, or
4. Exhibiting disorderly conduct (see Undergraduate Judicial Code re: "Disorderly Conduct").

Category III Distribution

*Any situation in which impairment is deemed an aggravating factor in conjunction with a violation of the Undergraduate Judicial Code, the individual may be charged with both a Judicial Code violation AND an Alcohol Policy violation.

+This wording has been adapted from North Carolina General Statutes specifically for the Duke community to reflect the university's private status.

B. Sanctions:

Offenses will be accumulated over the course of an undergraduate's academic career and sanctions will be applied accordingly.

*Category I**

1st Offense: Formal warning with possible referral to the substance abuse specialist.

2nd Offense: Housing License placed in Imminent Jeopardy (letter sent to parents of first-year students) with possible referral to the substance abuse specialist.

*If a student is charged with a Category I, first offense violation, s/he may enter a plea of guilty and accept the automatic sanction(s) or s/he may request a formal hearing. Additionally, a Category I, first offense violation will be recorded on a student's disciplinary record for *internal purposes only* unless the student is found guilty of a subsequent Category I violation. At that time *both* violations become part of the student's disciplinary record.

3rd Offense: Housing License revocation for one (1) year and disciplinary probation for remainder of academic career with possible referral to the substance abuse specialist.

Category II

1st Offense: Disciplinary probation for one (1) semester, campus community service (5-15 hours) and/or referral to the substance abuse specialist.

2nd Offense: Suspended suspension for one (1) year, campus community service (15-30 hours) and/or referral to the substance abuse specialist.

3rd Offense: Suspension for two (2) semesters with a requirement to seek alcohol abuse assessment and/or counseling before requesting re-admission.

Category III

1st Offense: Housing License placed in Imminent Jeopardy (letter sent to parents of first-year students), disciplinary probation for one (1) year.

2nd Offense: Housing License revocation for one (1) year, disciplinary probation for remainder of academic career.

3rd Offense: Suspension for two (2) semesters.

II. GROUPS

A. Violations

Category I Violations of any General Provisions or Event regulations as previously defined

Category II Distribution

B. Sanctions:

Offenses will be accumulated on a three (3)-year basis and sanctions will be applied accordingly. After three years from the date of a sanctioned violation, the incident will no longer be counted in the accumulation of alcohol offenses.

Category I May include, but are not limited to, any of the following:

Disciplinary probation

Mandatory alcohol awareness programs

Fines

Notification to governing body

Campus community service

Social suspension

Loss of university recognition

Category II

1st Offense: Four (4)-week social suspension.*

Campus community service (5 hours, per member).

2nd Offense: Twelve (12)-week social suspension*

Campus community service (10 hours, per member).

Notification to governing body (e.g., coach, faculty advisor, national organization, etc.).

Fine - \$10 per member. (Moneys collected will be distributed as follows: 50 percent to Duke Police for use in alcohol enforcement and education and 50 percent to Student Health Education).

*Social suspension will be based upon the academic calendar.

3rd Offense: Notification to governing body.

Loss of university recognition for one (1) year.

EVENT REGULATIONS AND REGISTRATION

General Provisions

1. Events in public spaces at which alcohol will be consumed, including events where alcohol is distributed or is provided by the individual consuming it, shall be governed by regulations determined by the Alcohol Regulations Review Committee and published by the Event Advising Center.
2. All residential and social groups are responsible for designing a member to participate in an Alcohol Awareness Session at the beginning of the fall semester. Event registration will not be approved until this has occurred. This representative must recognize that he/she is responsible for disseminating current information concerning the use of alcohol and the existing state and university regulations concerning its use to members of his/her organization.
3. Events may be no longer than a four hour period.
4. At events where distribution occurs, there must be food and alternative beverage. (See regulations under the "Distribution" section of the Alcohol Policy).
5. Sponsoring groups may be held responsible for the space in which the event is held, including the area immediately adjacent to their space (i.e., outside area, benches, etc.).
6. Sponsoring groups and living groups remain responsible for the general tone of their social events (i.e., proper planning, trash removal, knowingly enabling underage drinking to occur, disorderly conduct, etc.), and by majority vote, they may adopt regulations more limiting than the laws of the state and the provisions of this policy.
7. The sponsoring group should be responsible for providing monitors at all registered events where alcohol is present, whether it is a BYOB or a distribution event. Monitors should be posted at every access point to the party. The purpose of monitors at BYOB events is to check for glass bottles. The purpose at distribution events is to ensure that alcohol is not brought in.
8. Any event advertisement may not use alcohol as the focus of the event nor may it encourage excessive drinking. It may, however, reference alcohol and likely will inform others of the type of event being hosted (i.e., BYOB, distribution, dry).

Registration

Events must be registered if ANY of the following occur:*

1. Distribution of alcohol.
2. Sound amplification is placed or directed outside.
3. Events are publicized (advertised by commercial ads, banners, posters, written invitations, e-mail, etc.).
4. Event involves a theme, decorations, or live entertainment.
5. Sponsoring group is using a facility other than the facility in which the group resides.

*An event is defined as a party, concert, or other social gathering held on the university campus attended by undergraduates.

Events must be registered with the Event Advising Center located in the Office of University Life, 101 Bryan Center, West Campus. Registration forms must be completed and returned for approval to the office four (4) business days prior to the event. Call 684-3084 for more information. For larger events, and/or events involving contracted performers, early registration is highly recommended. Call 684-3084 or email: events@acpub.duke.edu

The dean of University Life or designee reserves the right to approve/disapprove the serving of alcoholic beverages at events held in nonresidential locations (to include quadrangles) on a case-by-case basis. Duke University Police Department, in consultation with the dean of University Life or designee, will determine whether the individual or group sponsoring a registered event will be required to hire Duke police officer(s) to monitor the event.

The number of CI Quad events will be limited to major, university-wide activities designated by the Event Advising Center Oversight Committee. This committee also reserves the right to approve/disapprove any event which poses potential safety hazards.

Concerts and events involving the services of a promoter or promotion company may be done by, or in conjunction with, committees of the Duke University Union only.

PARTY PROMOTION

By choosing to serve beverages containing alcohol as part of a social function, you and your group or organization assume certain responsibilities beyond direct university regulation.

Test cases involving common law precedents and the dispensation of alcoholic beverages are changing the definition of who is liable for a drinker's actions to include the general category of "social hosts." A social host may be a fraternity, a residence hall organization, a private citizen, or any combination of the preceding.

For example, serving alcohol to a minor who subsequently breaks his leg could render an individual or group liable for the minor's medical bills. Serving an individual who is "already" or "obviously" drunk and who subsequently has an automobile accident could render an individual or group liable for the injury or death of third party victims of the accident, or any property damage resulting from the accidents.

In general, CREATING OR PROMOTING ANY SET OF CIRCUMSTANCES WHICH ENCOURAGE ANY OF YOUR GUESTS TO CONSUME ALCOHOL TO THE POINT OF INTOXICATION CAN HAVE FAR REACHING NEGATIVE CONSEQUENCES OF A MOST SEVERE NATURE.

Legal proof of negligence in the dispensation of alcohol usually involves the consideration of wide variety of factors, including the manner in which hosts promote social functions where alcohol is served.

In addition to the responsible monitoring of the social event itself, IT IS IMPERATIVE THAT YOU AND YOUR GROUP OR ORGANIZATION DO NOT PROMOTE YOUR EVENT IN SUCH A MANNER THAT A POTENTIAL GUEST MIGHT REASONABLY BELIEVE YOUR SOCIAL EVENT IS AN INVITATION TO BECOME INTOXICATED.

SPECIFICALLY: FLYERS, BANNERS, AND SIGNS WHICH ADVERTISE SOCIAL EVENTS WHERE ALCOHOL WILL BE SERVED MUST NOT OVERTLY OR COVERTLY STATE OR IMPLY AN INVITATION TO PARTICIPATE IN EXCESSIVE DRINKING.

ANIMAL ABUSE PROHIBITION

1. Animals, live or dead, may not be used in pranks or otherwise for amusement or ceremony in connection with any institutional or university-recognized group

function or activity. Violation of this policy or any other abuse of animals shall be grounds for disciplinary action.

2. For purposes of this policy, the term "animal" includes any wild or domesticated, warm-blooded or cold-blooded animal.

ANIMALS ON CAMPUS

The Durham Animal Control Ordinance states that it is illegal to allow animals to run unrestrained anywhere in Durham County, including the Duke University Campus. Violators may be issued a citation and trespassed from the campus for violation of the Ordinance.

All animals found running loose on campus or tied to an obstacle with the animals unattended by the owner will be removed from the campus to the Durham County Animal Shelter by a county official. With the exception of seeing-eye dogs, animals are prohibited inside university facilities. Upon claiming the animal the owner will be required to furnish identification. The Duke University Police Department will refer the names of such students to the appropriate dean; employees will be referred to their department head.

BICYCLES

A bicycle may be kept by the owner in her/his assigned bedroom space. Bicycles are not permitted in other areas of the residence halls such as commons rooms, bathrooms, hallways, stairwells, study rooms, and entrances. In compliance with Durham Fire Marshal regulations, bicycles found in unauthorized areas of the residence halls will be removed without warning and the owners will be required to pay removal fees in order to recover them. The university is not responsible for damage to bicycles or devices used to secure them.

CAMPUS BANNER POLICY

- I. Requests for hanging banners on university buildings must be approved by the Facilities Management Department. Banners must be inherently flame resistant or sprayed with a flame retardant spray as approved by the OESO-Fire Safety Division. If approved, a banner may be hung for a period of not more than three days. The banner must be removed by the sponsoring organization within 24 hours of the event that it advertises. In the event that there is no date for the banner, then a three-day maximum will be established for its display. If the group fails to remove the banner within the designated time, the university will remove it at a cost to the responsible organization or individuals. Where no sponsoring organization or individual may be identified, banners will be taken down immediately.

- II. Banners on Light Poles

All banners approved by the Facilities Management Department Banner Committee (FMDBC) for placement on light poles throughout the university will meet the following criteria:

- Banners will be tasteful and in accordance with the high standards set by Duke University.
- No on/off campus business advertising is permitted on banners approved by the FMDBC.
- Banners will meet the criteria set for size, seaming, and grommet placement.
- Banners will only be placed on designated light poles.
- Banners approved for placement by the FMDBC will not remain in place

longer than fourteen (14) consecutive days. Exceptions may be approved by the FMDBC (example: United Way banners).

- Banners will be assigned to Facilities Management Department (FMD) for placement and removal.

Requesting Procedure

Individual requesting placement and removal of banner should complete the information requested on the form available either in the Event Advising Center or in 200 Facilities Center.

- Request the placement of banners at least fourteen (14) days prior to the first date of placement.
- Provide sample of actual banner to be placed.
- List contact person for all banner issues.
- Provide Interdepartmental Request (IRI) Charge Code with initial banner request.

Once the request for the placement of banners is received, the FMDBC will respond within five working days on the disposition of each request. Once action is taken, the requestor will be notified immediately. FMD will provide information on vendors, timing, and design of banners upon request. Once the banners' placement period has expired, FMD will remove banners and return them to the requestor.

III. Banners on the West Union Building

Brackets for hanging banners have been installed on each side of West Union Building at the Bryan Center walkway. Facilities Management Department personnel will be happy to hang and remove banners for students groups at no cost

- Banners must be tasteful and in accordance with the high standards set by Duke University
- No on/off campus business advertising is permitted on banners
- Banners must measure 6' x 6' and must have a 2-inch hem at the top to facilitate hanging
- Students must call 684-2122 and provide the operator with specific information such as:
 - 1) Where the banner should be placed (which side of the building, if possible)
 - 2) What date the banner is to be installed and removed
 - 3) Who will deliver the banner and does the student(s) want the banner returned

CHALKING OF UNIVERSITY FACILITIES

The extensive use of chalk to advertise events and activities on buildings, sidewalks, and other university facilities and structures has caused major problems because the chalk must be removed at a considerable expense. Therefore, any individuals or groups identified as being responsible for chalking university facilities will be charged for clean up and also may be subject to judicial action.

CLASSROOM RESERVATIONS

Students may reserve classrooms for meetings of organizations recognized by Duke Student Government on a one-time or semester basis by going in person, with their

DukeCards, to the registrar's office between the hours of 8:00 a.m. -5:00 p.m. Monday through Friday. Rooms must be reserved by an officer of the organization and groups will be expected to abide by the terms outlined on the reservation form. Lecture halls or rooms with a capacity of more than 60 cannot be reserved more than six days in advance, unless they are reserved by the faculty advisor of the organization.

CONFERENCES AND CONVENTIONS

Invitations to individuals or to organizations outside the university to hold conferences or conventions on campus must be discussed with and approved by the dean of University Life well in advance of the extension of the invitation by the prospective host or host group at Duke. It is the established policy of the university not to use its dormitory facilities for the housing of convention guests during the academic year. The university does, however, reserve the right to use dormitory rooms for special guests during announced vacations.

DISCRIMINATION, APPEAL PROCEDURE FOR STUDENT EMPLOYMENT

Complaints from students of discrimination regarding hiring practices should be filed in writing with the Office of Undergraduate Financial Aid, 2106 Campus Drive. A staff representative of the Office of Financial Aid shall notify the university equal opportunity officer in writing of the complaint within ten (10) working days. The equal opportunity officer will investigate the complaint, notify the Office of Student Affairs and the respective college or school of the student, and attempt to reconcile the parties. Should the complainant feel that the complaint of discrimination has not been remedied after receiving a written evaluation from the equal opportunity officer, appeal may be made to the respective dean of the student's college or school.

DRUGS

Duke University prohibits its members to possess, use, or distribute illegal drugs, including opiates, barbiturates, amphetamines, marijuana, and hallucinogens, except for legally authorized possession and distribution of drugs of the classes specified. In addition, the presence and use of many of these drugs within the university community are contrary to the intellectual and educational purposes for which the university exists.

The university recognizes that ignorance or innocence concerning such drugs threatens the safety of members of its community. It therefore seeks to provide as much information as it can concerning the consequences of harmful drugs. The university recognizes also that the illicit use of drugs may reflect emotional problems and is prepared to assist its members involved in their use through medical and psychiatric counseling. Nevertheless, the university considers a violation of the drug prohibition a serious matter and reserves the right to take action appropriate to the circumstances of each case.

Action taken by the university in all cases of drug violation will be guided by a concern both for the emotional and physical welfare of the person involved and for the maintenance of a suitable educational environment for all members of the university. See Appendix D for rules governing drug violations.

DUKE COMPUTER USAGE GUIDELINES

A student's use of Duke-owned computer facilities and access to the Internet is a privilege, not a right, accorded by the University. Students are responsible for the appropriate and acceptable use of these facilities. Abuses include but are not limited to:

1. Unauthorized entry into a file to use, read, or change the contents, or for any other purpose.
2. Unauthorized use of another individual's identification and password.

3. Use of computing facilities for the purpose of impeding the work of another student, faculty member, or University official.
4. Use of computing facilities to send material which violates university harassment policies, contractual obligations, or state or federal laws.
5. Usage of computing facilities which interferes with normal operation of the University computing system.

Electronic transmissions are logged and the logs will be consulted, if necessary, to investigate possible violations of these guidelines. Offenders will be subject to disciplinary action, including the possible loss of their accounts in the University's academic computing system.

DURHAM FIRE MARSHAL REGULATIONS

North Carolina fire safety codes prohibit the obstruction of hallways and stairwells. The Durham Fire Marshal mandates the **immediate** removal of all items obstructing hallways and stairwells. Housing Management will remove **without warning or reimbursement** furniture, bicycles, lumber, and all other items found obstructing hallways or stairwells. University furniture will be removed from hall ways and stairwells and you will be charged for any missing furniture when you vacate your room.

North Carolina law prohibits the use of portable charcoal, gas, or electric grills within 10 feet of all residence halls. Grills must be at least 10 feet away from all residence halls when in use. Storage of grills not in use, which are cool, is permitted, Failure to abide by this ordinance may result in a fine as determined by the Durham Fire Marshal.

FIRE EQUIPMENT

In an effort to provide adequate protection, fire extinguishers are located in all residence halls. Because of the presence of this equipment, numerous fires have been quickly controlled, avoiding injury or loss of life. The potential impact of having fire extinguishers vandalized or stolen is clear; yet each year individuals continue to disregard the safety and rights of others by destroying and tampering with this equipment.

Damage and/or theft of fire equipment is punishable under North Carolina General Statute 14-286 which carries a maximum penalty of six months imprisonment and/or \$500 fine. In addition, students who have allegedly misused or vandalized fire equipment may have their housing licenses revoked and/or be referred for disciplinary action. Judgments rendered by this board may result in the loss of housing privileges and/or other punishment.

To further assure life safety, fire alarm systems are located in each residence hall at convenient locations to alert the occupants in case of fire. Turning in false alarms may result in unnecessary deployment of fire vehicles and the penalties for turning in false alarms or tampering with the alarm system are the same as those listed above. (See section on "Revocation of the Housing License," page 26.)

FIRE SAFETY

Open fires are not permitted on Duke University property except as approved by the OESO-Fire Safety Division and the Durham fire marshal. Students who either provide or contribute materials to burn or who ignite or attempt to ignite flammable materials will be considered in violation of this policy. Students also should realize that such actions violate state law and may result in their being issued a citation for unlawful burning. Any fire must be reported to Duke University Police and Housing Management. Residents will be charged for fire damage resulting from neglect.

FIREWORKS, OTHER EXPLOSIVES, AND WEAPONS

The General Statutes of North Carolina strictly prohibit the possession of firearms, explosives, starter pistols, and weapons on any university campus. Students are not permitted to bring to the campus or store on the campus any weapon, including any mace, gun, rifle, pistol, explosive, switch-blade, knife, or dagger. Students may not possess fireworks of any kind. If found to be in violation of this policy, students may have their housing licenses revoked and/or be referred for disciplinary action. See section on "Revocation of the Housing License," page 28.)

FILM POLICY AT DUKE

This policy is applicable to all persons or groups on campus showing films which are open to a general audience. ("General audience" is meant to convey "other than a strictly defined group" such as an academic class, and does not refer to the rating of film content as in "rated G for general audiences"). Such groups include but are not limited to academic departments, departmental groups, residential units, fraternities and sororities, and DSG chartered or recognized organizations. The policy applies to films for which admission is free as well as those for which an admission fee is charged or a donation is requested. The policy does not apply to academic departments showing films to class members only for educational purposes.

Presenters

A. Film Committee Presenters

The two major film committees responsible for carefully chosen film series are (1) the D.U.U. Freewater Film Series, presenting 16mm film (in multiple showings of two or three presentations each evening) on Tuesday, Thursday, and Friday in the Griffith Film Theater, Bryan University Center, and on certain occasions children's films on Saturday morning; and (2) Quadrangle Pictures (Quad Flicks)?the oldest film program on campus presenting 16mm films on each Saturday and Sunday (two showings each evening) in the Film Theater.

Participation in these committees is open to students, faculty, and staff. For both series, contact the program adviser or the chairperson of the Freewater Presentations, 101 Bryan University Center, 684-2911. Both series solicit the opinions of the student body and faculty in the selections of films and are most happy to cooperate whenever possible in bringing films requested by departments and organizations.

During the two summer sessions, Freewater and Quadrangle Pictures show films in the Griffith Film Theater, Bryan University Center one night a week.

B. General Campus Presenters

Monday and Wednesday evenings may be utilized by general campus presenters (including but not limited to academic departments, departmental groups, residential units, fraternities and sororities, and by organizations chartered or recognized by DSG) to have public showings of films on campus. If admission is charged, the sponsoring group must use the Griffith Film Theater of the Bryan University Center (for 16 mm films) or Page Auditorium (for 35 mm films), for which appropriate tax payment has been made to the state. The presenters should be aware of and should adhere to the following regulations:

1. All sponsors presenting forms on campus which are open to a general audience must register the film screening with the Office of University

Life (101-3 Bryan University Center, 648-4741) in order to minimize conflicts between competing films. Film screening should be registered at the same time the venue is reserved. It is the responsibility of the sponsoring group to check other campus sources for possible conflicts. The Office of University Life is not responsible for conflicts due to the failure of any party to adhere to the *Film Policy at Duke*.

2. All film presentations must be sponsored by Duke University groups or organizations with funds from admission sales going to the respective group or organization.
3. No film showing may be presented for an individual's self-aggrandizement.
4. Groups or departments under the jurisdiction of Student Affairs (including all student groups) will have permission withheld for the showing of x-rated films until justification for their presentation is reviewed. Other films which, regardless of rating, contain explicit sex and/or violence or which have been found to encourage disruptive behavior also may be restricted or subject to special conditions. Academic departments and departmental groups are responsible for adherence to local ordinance and state law concerning audience admission and the film rating system.
5. All film presenters using Griffith Film Theater or Page Auditorium must employ the services of a house manager and a projectionist. The building manager, Bryan University Center (001A Bryan Center, across from Von Canon Hall) can arrange these services for the Griffith Film Theater. The manager of Page Auditorium (03 Page, 684-5155) should be contacted to arrange these services for Page Auditorium. Both offices will provide an estimate of costs for these services. These employees will be present throughout the entire presentation.
6. All public announcements for the film showings (such as fliers, posters, calendar, and Chronicle announcements) must be made to display clearly the sponsoring group's official name. Advertising for all film presentations is restricted to the campus media.

Resources

A. Film Sources

A complete up-to-date collection of film catalogues may be found in the D.U. Union Office and the University Life office, both at 101 Bryan University Center. The reference room of Perkins Library also has extensive files of film catalogues and other relevant reference material. Catalogues may also be ordered directly from film companies.

B. Equipment

Griffith Film Theater and Page Auditorium are equipped with 16 mm and 35 mm projectors, respectively. Projectors and equipment for other venues may be rented from Technical Services (0044 Bryan University Center, inside the "greenhouse" by the circle). The Durham County Library (on North Roxboro Street) also has screens and 16 mm projectors for rent. You must have a library card to rent these.

C. Advising

The Office of University Life provides advising on all aspects of film presentation including choice of venue, choice of film, budget, and program logistics and management. Film committees and DSG chartered / recognized organizations are required to consult a dean of University Life when

programming films. The Office of University Life also maintains a calendar of all film screenings on campus open to general audiences.

Locations for Film Showings. The auditoriums on the Duke campus authorized for film showings for which an admission is charged are the Griffith Film Theater in the Bryan University Center (16 mm) and Page Auditorium (35 mm). These venues are covered by the payment of a privilege license tax paid by Duke University to the state of North Carolina. To charge admission to films shown in other areas is in violation of state law and brings into question the legal position of the university.

Free Films. If no admission is charged and no donation is received, films may be publicly shown in any appropriate room on campus, but their scheduling must adhere to other rules applicable to general campus film presenters to prevent conflicts.

Possible Film Restrictions

A. "X-Rated" Films Policy—Permission is withheld from film presenters for the showing of x-rated films until justification for their presentation is made through appeal.

1. An appeal by the Freewater Film Society and by other organizations under the jurisdiction of the University Union will be reviewed by the board of the University Union whose decision will be communicated to the vice-president for Student Affairs for final review.
2. An appeal by all other student groups including DSG-chartered/recognized organizations will be reviewed by the vice-president for Student Affairs directly. All reviews and subsequent decisions will take into account, among other considerations, the objectives to be served by exhibiting the film, its educational value, and the extent to which the request can be supported by a social or aesthetic justification. When, in response to an appeal, permission is granted to present an x-rated film, the following procedures will be required: the vice-president for Student Affairs will (a) decide whether or not the film in question shall be listed in the *Duke Dialogue*, (b) designate what kind of identification may be required of members of the Duke University community and/or their guests, (c) decide whether or not a representative of the Public Safety Office may be required for the purposes of assisting the sponsoring group, at the latter's expense. In addition, those attending must show proof of age that complies with North Carolina state law.

B. Other Film Restrictions—The decision to withhold the scheduling of films which, regardless of rating, contain explicit sex and/or violence are shown or have been found to encourage disruptive behavior may be made by:

1. The University Union Board for Films proposed by the Freewater Film Society and by other organizations under its jurisdiction.
2. The deans of the Office of University Life for films proposed by other student groups or organizations. The decision by either of these boards to withhold the scheduling of a film may be appealed to the vice-president for Student Affairs. When in response to an appeal, a favorable decision is reached, the same procedures listed in (a) through (c) will be required.

Film Scheduling Procedures and Regulations

A. Regulation-All General Campus Presenters

1. All general campus presenters must register screening dates and film titles at the Office of University Life. Screening dates should be registered at the same time the venue is reserved or put on hold. Film title must be registered before the film is ordered.

2. Venues may be reserved for film screenings at any time in accordance with the reservation policies of the specific venue. The selection of specific film titles must be made according to the following schedule: for films shown in the fall semester, titles may be chosen after the preceding July 1; for films shown in the spring semester, titles may be chosen after the previous December 1; for films shown during summer sessions, titles may be chosen after April 1.
 3. Film presenters may schedule only one film per semester. All exceptions must be approved by the Office of University Life.
 4. No film may be shown that is already scheduled for the academic year until following the originally scheduled showing. If groups decide to show a film that is scheduled already, they may not announce publicly in any way their choice of film presentation until the initial group has shown the film.
 5. No public film showing (those announced to the general university community) may be scheduled at the same time on the same day as another film which has been scheduled already, unless no conflict is perceived by the group having completed its scheduling paperwork first. It is the responsibility of the sponsoring group to check other campus sources for possible conflicts. The Office of University Life is not responsible for conflicts due to the failure of any party to adhere to the *Policy Concerning Films at Duke*.
 6. Films shown outside must be registered and approved by Dean Susan Coon in the Office of University Life in addition to all other approvals, and must not fall within university quiet hours.
- B. Procedures-Student Organizations
1. Consult the University Calendar and the Film Calendar in the Office of University Life as well as other campus sources to check for possible conflicts with other films and programs.
 2. Put a "hold" on the venue for your most preferred available date(s)-(Mondays and Wednesdays only). For the Griffith Film Theater, contact Janice Daniel, 684-2656. (You must return a deposit to reserve the film theater within five business days after holding a date, or your hold will be canceled.) For Page Auditorium, contact Dean Peter Coyle, 684-4682. For other locations, call the location for information.
 3. Go to the Office of University Life for advising and information on film selection, budgeting, financial approvals, and program approvals. Approvals will not be given until the following arrangements have been made: (a) the organization's account has been reviewed to determine the ability of the organization to cover the film rental, film transportation, and both security and technical costs of the film presentation, (b) all financial forms necessary for reserving the venue have been completed and signed, and (c) the film title has been chosen and approved and does not conflict with any other registered film showing. Information which you will need includes (1) rating of film, (2) running time of film, (3) cost of film and cost of film transportation.
 4. When all approvals have been received and the film has been selected and approved, confirm reservation with the venue and make final arrangements for equipment rentals, house manager, and projectionist when necessary. (For Page Auditorium and Griffith Film Theater, house manager and projectionist are necessary.)
 5. All arrangements and approvals for film showings must be completed

no later than three weeks prior to the date of showing. Failure to do so may result in the forfeiture of your scheduling privileges and the cancellation of your program.

6. Approved and confirmed film showings in the Griffith Film Theater and Page Auditorium may be canceled without penalty up to one week prior to the screening.
7. Common areas in residence halls and other such university facilities may not be used for the showing of "stag" films.

C. Procedures-Other Campus Presenters.

1. All other campus film presenters should reserve screening locations in accordance with each venue's normal reservation policies. Films open to general audiences are allowed on Mondays and Wednesdays only.
2. All general campus presenters must register screening dates and film titles at the Office of University Life. Screening dates should be registered at the same time the venue is reserved or put on hold. Film title must be registered before the film is ordered.
3. Non-student groups are responsible for adherence to local ordinance and state law concerning audience admission and the film rating system.

Screening of Copyrighted Videos

Federal law prohibits the public display of copyrighted videotaped material. This includes videos which you buy and those which you rent. "To perform or display a work or video 'publicly' means (1) to perform or display it at a place open to the public or at any place where a substantial number of persons outside of a normal circle of a family and its social acquaintances is gathered." (From the Federal Copyright Act, Title 17 United States Code, Section 101). Though the language is not specific, the showing of videos for social purposes to groups could be a violation of federal law. To avoid such conflict and decrease the likelihood of copyright violations, the following procedure should be followed when screening videos:

1. Never charge admission for a video screening of copyrighted material unless you have paid the proper authority a royalty to do so.
2. Whenever possible, video screenings for entertainment and social purposes should take place in private rooms.
3. In the event a video screening takes place in a common room, it is advisable to limit viewers to ten (10) people.

HARASSMENT POLICY

*This harassment policy applies to all persons who are enrolled or employed by Duke University. All such persons may use the accompanying grievance procedures in seeking resolution of harassment complaints involving other members of the Duke University community.**

Harassment of any kind is not acceptable at Duke University; it is inconsistent with the university's commitments to excellence and to respect for all individuals. Duke University is also committed to the free and vigorous discussion of ideas and issues, which the university believes will be protected by this policy. Pursuant to these commitments, and as a complement to Duke University's Equal Opportunity Policy, the following policy is adopted.

*Applicants for admission or employment who feel that they have been harassed by employees of Duke University, and students and employees of Duke University who feel they have been harassed by persons doing business with the university should report their complaints to the Office of the Vice-President for Institutional Equity.

- I. Duke University is committed to protecting the academic freedom and freedom of expression of all members of the university community. This policy against harassment shall be applied in a manner that protects the academic freedom and freedom of expression of all parties to a complaint. Academic freedom and freedom of expression include, but are not limited to, the expression of ideas, however controversial, in the classroom, in residence halls, and, in keeping with different responsibilities, in work places elsewhere in the university community.
- II. Harassment at Duke University is defined as follows:
 - A. The creation of a hostile or intimidating environment, in which verbal or physical conduct, because of its severity and/or persistence, is likely to interfere significantly with an individual's work or education, or affect adversely an individual's living conditions.
 - B. Sexual coercion is a form of harassment with specific distinguishing characteristics. It consists of unwelcome sexual advances, requests for sexual favors, or other verbal or physical conduct of a sexual nature when:
 1. submission to such conduct is made explicitly or implicitly a term or condition of an individual's employment or education; or
 2. submission or rejection of such conduct is used as a basis for employment or educational decisions affecting an individual.
 - C. The conduct alleged to constitute harassment under this policy shall be evaluated from the perspective of a reasonable person similarly situated to the complainant and considering all the circumstances.
- III. In considering a complaint under the Duke University Harassment Policy, the following understandings shall apply:
 - A. Harassment must be distinguished from behavior which, even though unpleasant or disconcerting, may be appropriate to the carrying out of certain instructional, advisory, or supervisory responsibilities.
 - B. In so far as Title VII (Equal Employment Opportunity) of the Civil Rights Act of 1964 is applicable (i.e., in complaints concerning carrying out of noninstructional work place responsibilities, the university will use the definition of sexual harassment found in the Equal Employment Opportunity Commission (EEOC) Guidelines: "conduct of a sexual nature...when such conduct has the purpose or effect of unreasonably interfering with an individual's work performance or creating an intimidating, hostile, or offensive working environment." The university will use new EEOC guidelines as they are promulgated. The community will be notified if such changes occur.
 - C. Instructional responsibilities require appropriate latitude for pedagogical decisions concerning the topics discussed and methods used to draw students into discussion and full participation.
 - D. In interactions of students and other members of the Duke community in social and living situations, the university believes it is generally more appropriate to encourage and nurture positive interactions and understanding between complainants and respondents rather than to invite charges of harassment for individual episodes of hostile, disrespectful, or intimidating speech.
- IV. Individuals who believe that they have been harassed in violation of this policy should consult the Duke University Grievance Procedures for Claims of Harassment.

- V. This Harassment Policy and the Grievance Procedures for Claims of Harassment are not the only part of Duke University's effort to prevent harassment in our community. In addition to offering channels for making and resolving complaints, the university is also committed to programs of education to raise awareness concerning the nature of harassment and ways to prevent harassing behaviors.

RESPONDING TO HARASSING SITUATIONS

A member of the Duke University community who believes that he or she has been harassed in violation of the Harassment Policy is encouraged to take action in any of the ways described here. Although none of the informal activities below are required before an individual may file a formal complaint, the Duke University Harassment Policy favors informal resolution of Harassment claims whenever such resolutions can be effected fairly.

Informal resolutions may include:

- A. Discussing the situation with harassment prevention advisors and other designated individuals, who are available in the office of Student Affairs, Trinity College, and the School of Engineering:

Maureen Cullins	Campus Community Development	684-6538
Carlisle Harvard	International House	684-3585
Seldon Holt	Women's Center	684-3897
Ellen Plummer	Women's Center	684-3897
Julian Sanchez	Intercultural Affairs	684-6756
Connie Simmons	School of Engineering	660-5387
Kay Singer	Trinity College	684-6221
Kathleen C. Wallace	Student Development	684-6313
Suzanne Wasiolek	Student Affairs	684-5363
Judith White	President's Office	684-2424

- B. Meeting with the individual whose behavior is disturbing, discussing the situation, and making it clear that the behavior is unwanted and should cease.
- C. Contacting the supervisor or dean of the person whose behavior is disturbing and requesting assistance to stop the behavior.
- D. Requesting assistance from a harassment prevention advisors for an informal intervention:

In consultation with the harassment prevention/EEO administrator, a harassment prevention advisor may assist an individual who does not wish to file a formal complaint, but who seeks informal intervention by the harassment prevention advisor to end conduct that the person believes violates university policies against harassment. After consultation with the harassment prevention/EEO administrator, the harassment prevention advisor, or another person designated by the coordinator may discuss the alleged conduct with the respondent, remind him or her of university policies against harassment, and seek a commitment by the respondent to comply with these policies.

A complainant may request that, whenever possible, such a conversation be held without revealing his or her identity directly to the respondent. Action taken by a harassment prevention advisor under this provision shall not constitute a finding of harassment.

FORMAL COMPLAINT PROCEDURES

Formal complaints of harassment should be filed with the harassment prevention coordinator in the Office of the Vice-President for Institutional Equity. Such formal complaints should be filed as soon after the offending conduct as possible, but in no event more than one year after the most recent conduct alleged to constitute harassment.

The process for resolution of formal harassment complaints consists of two stages: Mediation (and) Panel Hearing. The complaint must be submitted to Mediation before it can be submitted to the Hearing Panel for resolution.

In certain circumstances, violations of the Harassment Policy may be adjudicated through the undergraduate judicial system.

For more information about initiating formal complaints, see the Duke University Harassment Policy "Procedures for Resolution of Claims of Harassment." These are available through the Harassment Prevention Advisors (see above) or the Harassment Prevention/EEO Administrator.

HAZING

Duke University considers hazing to be a serious infraction of university regulations. Hazing Policy: Any action taken or situation created, intentionally, whether on or off fraternity, sorority, or university premises, to include physical discomfort, embarrassment, harassment, or ridicule. Such activities and situations include but are not limited to paddling in any form; creation of excessive fatigue; physical and psychological shocks; road trips, or any other such activities carried on, in or outside the confines of the university; wearing publicly apparel which is conspicuous and not normally in good taste; engaging in public stunts and buffoonery, morally degrading or humiliating games and activities which are not consistent with fraternal law, ritual, or policy or the regulations and policies of Duke University. (Modified from: Statement on Hazing, Fraternity Executive Association.) Students should also be aware that hazing is a misdemeanor under North Carolina state law and is punishable by up to a \$500 fine and/or six months imprisonment. The action of even one member of the group may constitute hazing by the fraternity or sorority. Any fraternity or sorority convicted of hazing may be warned, placed on probation, or the charter of the group suspended for a period of time or permanently. Individuals responsible for hazing also are liable for disciplinary action.

IDENTIFICATION CARDS

Undergraduate students are issued identification cards (the DukeCard) which they should carry at all times. The cards are the means of identification for library privileges, student health services, athletic events, access to residence halls and academic buildings, and other university functions or services open to them as university students. These cards also serve to purchase food on a selected meal plan or other food and nonfood items on the flexible spending account. Students will be expected to present their cards upon request to any university official or employee.

The cards are not transferable, and fraudulent use may result in loss of student privileges or suspension. A student should report the loss of this card immediately to the DukeCard Office, 024 Union Building West, 684-5800. Temporary cards for access to residence halls can be obtained at the DukeCard Office twenty-four hours a day. The cost of a new DukeCard is \$10.

LIBRARY MATERIALS SECURITY

Library materials are electronically protected by a theft detection system. An alarm sounds when items have not been properly charged, requiring the person to return to the circulation desk nearby to ascertain the problem.

Anyone who refuses to permit his or her books to be examined may be denied further use of the library. Student offenders will be reported to the appropriate dean at the university, who is authorized to refer such offenders to judicial boards or to take independent disciplinary action, including penalties, up to and including suspension, appropriate to the seriousness of the offense.

LIBRARY FINES AND CHARGES

Students will be delinquent if they owe more than \$250 in library charges and borrowing privileges may be suspended until the charges are resolved.

Recalled books not returned after ten days will be fined \$1 per day per book.

LIBRARY POLICY CONCERNING FOOD, DRINK, AND TOBACCO IN PUBLIC AREAS

This policy is meant to decrease:

- a. Damage to books, electronic equipment and furnishings.
- b. Attraction of vermin to the building and the collections.
- c. Deterioration of a pleasant, studious environment in the reference area and general stacks.
- d. Cost of housekeeping within this extensive building.

The policy applies in public areas of the library (with the exceptions noted below) to all persons, including university staff, faculty, students, and all others working in or using the library. Public areas include elevators, hallways, stairwells, carrels, and all book stacks. Also, this policy applies while walking through public areas of the library.

1. No food or drink is permitted except in designated areas. These designated areas are: Deryl Hart Room, the Gothic Reading Room, the Perk, the front lobby, faculty and staff lounges, and meeting rooms (223A, 226, the Carpenter Board Room, and the Breedlove Room).
2. No smoking or other tobacco use is allowed anywhere in the building.
3. Food, drink, and tobacco will be subject to confiscation if used in undesignated areas.

MEDICAL CENTER STUDENT TRAFFIC

Duke Hospital and clinics provide medical service and support to thousands of patients and their families. Student traffic brings congestion, noise, and additional building maintenance that are incompatible with patient care.

Students are prohibited from using Duke Hospital South as a thoroughfare. Students must walk around Duke Hospital South via Trent Drive and Flowers Drive.

Additionally, students are not allowed to travel through Duke Hospital South to access Duke Hospital North.

Students are allowed access to Duke Hospital South for purposes of visiting the student infirmary, going to work, the bank, or the pharmacy. If requested, students must be able to document reason for being in the hospital. Hospital food service is not provided for students and is an unacceptable reason for accessing the hospital.

NOISE (DISORDERLY AND DESTRUCTIVE BEHAVIOR)

This policy has been developed after consultation with the Duke Student Government and the Campus Council. This policy is based on the belief that all persons residing in the community have a responsibility to respect the rights, health, security, and safety of other community members and that persons who repeatedly fail to respect others should no longer be afforded the privilege of residing in university housing.

Disorderly and/or destructive behavior by students is prohibited.

1. Any student accused of destroying personal or university property is liable for judicial action before the appropriate judicial body.
2. Quiet hours will be in effect throughout the campus except during the following hours on East, West, and North campuses:
5:00 P.M. to 7:00 P.M. Monday through Thursday (no amplified sound),
5:00 P.M. to 2:00 A.M. on Friday,
1:00 P.M. to 2:00 A.M. on Saturday, and
1:00 P.M. to 6:00 P.M. on Sunday.

Quiet hours are in effect twenty-four hours a day at Central Campus Apartments.

- a. Violations of quiet hours will be subject to the sanctions listed below, or they may be referred to the appropriate judicial body for adjudication.
- b. Even during the "non-quiet" hours listed above, students are expected to continue to respect the rights of others.
- c. During quiet hours, students who are disturbed should attempt to resolve the situation by contacting the other party(ies) involved; or, if needed, seek the assistance of house officers or resident advisors. In some areas of campus, an internal system for dealing with disturbances has been established by house officers (including distributing lists of house officers and RAs to contact) which has worked quite effectively. In some quadrangles, representatives from the adjacent living groups have met to establish "acceptable" levels of noise (i.e. specific volume settings on sound amplification systems). All quadrangle areas are strongly encouraged to implement mutually agreed upon procedures.
- d. If necessary, complaints may be registered by calling the on-call RA or Duke Police at 684-2444. Complainants should provide their names and locations when calling the Duke Police Department. Even during the "non-quiet" hours listed above, RAs and police officers will continue to respond to complaints and will notify those creating a disturbance that a complaint has been made. The officer responding to complaints will indicate whether noise was discovered upon his/her arrival in the incident report. If noise is found to exist, a complaint is automatically subject to disciplinary action. If no noise is discovered, no action will be taken. Complaints filed during "non-quiet" hours will not be considered as violations of the policy unless extenuating circumstances are present such as noise interfering with classes in progress.
- e. Duke police officers and resident advisors will forward to the associate dean of student development a report of all noise complaints. In cases subject to disciplinary action, the Duke Police or Resident Advisor Report will serve as the plaintiff. In cases where noise has been confirmed in one of the reports mentioned above, the following procedures and sanctions will be followed:
 1. For every complaint filed, a letter and a copy of the complaint will be forwarded to the student and/or president of the cohesive unit concerned informing them of the complaint.
 2. Upon receiving a third complaint, individuals and cohesive units will be issued an official warning.
 3. Upon receiving a fifth complaint, individuals and cohesive units will be placed on disciplinary probation for six (6) weeks.

4. Upon receiving a seventh complaint, individuals will be issued a suspended housing license revocation and cohesive units will be placed on social suspension for two (2) weeks, effective immediately.
5. Subsequent complaints will be referred to the appropriate judicial body.
- f. Should the Duke Police or Resident Advisor Report indicate that the student/group had already been warned and that the noise persisted and necessitated a return to the same student room or house in the same evening, an investigation may be begun into violation of the Noise Policy as well as the additional charge of "contempt."
- g. Residential and quadrangle parties are permitted provided that such parties have been approved under procedures as implemented through the Office of University Life.
- h. Under no circumstances during quiet hours may stereo speakers be placed or directed outside. During "non-quiet" hours, an individual or cohesive unit may only place or direct speakers outside for a function that has been approved by the dean of University Life.

It should be noted that residents are responsible for the actions of their guests and that cohesive units, as a whole, may be held responsible for violations of this policy by their individual members. The judicial body adjudicating violations of the above policy will follow its established procedures and may impose any sanctions available to it.



PAINTING POLICY

There has been a long-standing tradition of allowing student organizations and individuals to paint the East Campus bridge. Students are reminded that this activity may not extend beyond the bridge to include the painting of roads, sidewalks, telephone poles, lamp posts, trees, or any other university or municipal areas. Any groups or individuals identified as being responsible for painting anything other than the bridge will be charged for clean up and may also be subject to judicial action.

(Also see: Chalking of University Facilities, p. 55)

PARTIES IN RESIDENTIAL AREAS OUTSIDE OF RESIDENCE HALLS

See "Event Registration" in this bulletin.

PICKETS, PROTESTS, AND DEMONSTRATIONS

See Appendix D.

ROOF AND LEDGE AREAS, MAINTENANCE TUNNEL-UNAUTHORIZED ACCESS

The only authorized persons permitted on the roof and ledges or the tunnels of university buildings are maintenance personnel and certain other university officials. Students found in these areas will be referred for judicial action and/or may be subject to the immediate revocation of their housing license.

SAFETY

No institution can guarantee the safety of all students. It is therefore recommended that students exercise caution at all times. It is recommended that students avoid isolated areas. 684-SAFE (684-7233) may be called to request escort service from dusk to dawn.

1. Do not walk, jog, or bike alone outside of well-populated areas.
2. Keep your room and apartment door locked at all times whether or not you are present.
3. All external doors should be kept locked. Do not allow others to "tailgate" into a secured building behind you.
4. Immediately report to the Duke University Police Department, 911 or 684-2444, any incident taking place that threatens safety or appears suspicious.
5. Become familiar with the locations of campus "Help" phones and use them if you need assistance of any kind.

SOLICITATION POLICY

Commercial selling or soliciting in the residence halls or Central Campus Apartments is prohibited whether by residents or nonresidents.

The Bryan Center environs may be used for the purpose of sales, distribution, or events involving the use of sound amplification equipment. Any such activity must be sponsored by a recognized campus organization.

STUDENT RECORDS

In accordance with the Family Education Rights and Privacy Act of 1974, Duke University generally permits students to inspect their educational records and protects the information in such records from disclosure to third parties without the students' consent. The university's policy on the release of students' records is on file in the Office of the University Registrar.

Address and telephone information provided to the Office of the University

Registrar may be released without student consent unless written notification is provided to the office by the end of the second week of classes.

SUPPORT SERVICES FOR SURVIVORS OF SEXUAL VIOLENCE

Overview. Sexual violence is a term used to describe any kind of unwanted sexual activity, including rape, sexual assault, child sexual abuse or unwanted touching of certain areas of the body. Sexual assault is a criminal act, violating both North Carolina statutes and the Undergraduate Judicial Code (see p. 43-46). You can get assistance dealing with these crimes on campus whether they happened recently or in the past. Additional resource information is available at: [http://www.stuaff.duke.edu/deptpages/Women's Center/sass.html](http://www.stuaff.duke.edu/deptpages/Women's%20Center/sass.html)

Information, Advocacy, and Support. You can call Duke's Office of Sexual Assault Support Services (SASS) or Rape Crisis of Durham (RCD) for information. Both services are confidential and do not require making a report. They can explain your options, the implications of the actions you may be considering, and can serve as your advocate. These services are also available to you if you are helping a friend who has been assaulted.

To page the SASS coordinator 24-hours a day, dial 970-2315, and at the prompt, enter your phone number and hang up. The coordinator will dial you back. To schedule an appointment, come by the Women's Center, 126 Few Federation, 684-3897, or call the SASS crisis line 681-6882.

To reach Rape Crisis of Durham 24-hours a day, call 688-2883, and ask to speak to a rape crisis volunteer. Your number and first name will be taken and a volunteer will call you back.

Immediate Medical Concerns. Go directly to the Emergency Department (ED) of Duke Medical Center. You can call the Duke Police Department, 684-2444 or 911 for transportation without having to make a report. The services available are: medical care, evidence collection, payment options (delayed or direct billing), and medication for pregnancy and sexually transmitted disease prevention. To leave your options for pressing charges open and to be eligible for Victim's Assistance, a state fund which pays for the hospital expenses, you will want to have evidence collected by the hospital within 72 hours of the assault. If you do not want to make a report, a loan fund for repaying hospital bills is available through the SASS office.

Less Immediate Medical Concerns. Schedule an appointment at Student Health in the Pickens Building. You can call SASS for someone to accompany you if you would like. The services available are: medical care, medication for pregnancy and sexually transmitted disease prevention. All services are covered by the student health fee, except for a minimal charge for the morning-after pill. For non-urgent overnight care, the morning-after pill, or for super-confidential HIV counseling and testing, go to the Student Infirmary in Duke South, 684-3367.

Counseling or Emotional Support. SASS provides basic crisis intervention (short term support), referrals to counselors on and off campus who have experience working with survivors, information sessions, and survivors' networks. Counseling and Psychological Services (CAPS), 660-1000, provides individual counseling/psychotherapy, referrals, and in some semesters, group counseling.

Safety and Law Enforcement. Duke University Police will respond on an emergency basis to provide transportation to the Emergency Department, take reports of an assault, investigate, and participate in the appropriate legal or judicial action. They are responsible for notifying the community in a case of continuing danger, and they can provide the equivalent of a restraining order on the Duke campus.

SASS Worksheet

SERVICE:	Sexual Assault Support Services	Public Safety	Emergency Department, Hospital	Student Development	Resident Advisors	Student Health (Pickens)	Academic Deans	Rape Crisis of Durham	Infirmary	CAPS- Counseling	Durham Co. Health Dept.
24 Hour/Day Crisis Intervention	\$			I	I	I		\$	I	I	
24 Hour/Day Emergency Response	\$	\$	\$	S	S	I		\$	\$		
Confidentiality of Victim's Name	\$	\$		S	S	\$		\$	\$	\$	
Confidentiality of Situation	\$			\$				\$		\$	
Will Receive Anonymous Report	\$	\$						\$			
Medical Treatment	I		\$	I	I	\$		I	\$	I	
Criminal Investigation	I	\$		I				I			
University Judicial Investigation	I			\$			I				
Tresspass From Campus	I	\$		I							
Community Notification of Danger	I	\$		\$	\$						
Evidence Collection Kit	I	I	\$					I			
Liaison with Off-Campus Police		\$						\$			
Discuss Academic Intervention	I			I	I		\$			I	
Transportation to Hospital	I	\$					I	I			
Loan Fund for Medical Expenses	\$	I		I	I			I			
Individual Psychotherapy	I			I	I		I	I		\$	
Group Therapy	I			I	I		I	I		\$	
Survivor's Networks/Support Groups	\$			I	I	I		\$	I	\$	
Support Through Criminal/Civil Court	\$	I					I	\$			
Information for Friends of Survivors	\$	I		I	I	I		\$	I	\$	
Programs on Sexual Violence	\$	\$		I	I	I		\$	I	I	
Programs on Security	I	\$		\$	I					I	
Safe Haven	\$	I		I	I	I			I	I	
Referral to Off-Campus Therapists	\$							\$		\$	
Anonymous HIV Testing				I	I	I		I	I	I	\$
Super-Confidential HIV Testing	I			I	I	\$			\$	I	
KEY:											
\$	Provide Service										
I	Provides Information on Services/Serves as Advocate through Process										

Legal or Judicial Options. Your options include pursuing criminal charges, civil charges, or a complaint under the Undergraduate Judicial Code (see page 43). SASS or RCD can provide initial information and serve as an advocate for you through any of these processes. In the case of a university hearing, sanctions for a guilty verdict include, but are not limited to, recommendation for counseling, disciplinary probation, suspension, expulsion, and other sanctions deemed appropriate by the hearing body.

Academic and Residential Life. After a crisis or assault, you may have concerns about security or feel a need to change your residence or your phone number. You also may need academic intervention (an excuse from class, an extension, or a leave of absence). SASS can help you identify the appropriate deans and can accompany you or help you to arrange a meeting to discuss your needs.

SUPPORT SERVICES FOR SURVIVORS OF DATING VIOLENCE

Overview. Most dating relationships are fun, supportive, and loving; however, some dating relationships are characterized by a cycle of emotional control and/or physical violence that one person in a relationship exercises over the other. Control and abuse are intentional behaviors that often begin with jealousy, chronic put-downs, forced or urged isolation from friends and family, intimidation, and threats. Stalking, physical abuse, and/or sexual abuse may follow. The physical abuse may involve weapons and it can include different kinds of sexual assault. Once abuse begins, it usually continues and escalates.

This kind of abuse occurs in all cultural, racial, and socioeconomic groups, as well as in lesbian or gay relationships. Both men and women can be victims as well as perpetrators, though the majority of victims are female and the majority of perpetrators are male.

If you need help because of a difficult, controlling, or abusive relationship, please contact any of the following resources:

Information, Advocacy, and Support. Duke's Office of Sexual Assault Support Services (SASS) can provide you with support, information about your options both on campus and off, and can serve as an advocate for you. The Orange/Durham Coalition for Battered Women is an off-campus resource also available to provide advocacy, information, and references. If a friend has been abused, these same services are available to you in helping that friend. These services are free and confidential.

To page the SASS coordinator, 24-hours a day, dial 970-2315, and at the prompt, enter your phone number and hang up. The coordinator will call you back as soon as possible. You also can call the Women's Center, 684-3897, or the SASS crisis line, 681-6882, or come by 126 Few Federation.

To reach the Orange/Durham Coalition for Battered Women, 24-hours a day, call 688-2372, and ask to speak to an advocate from the coalition. Your number will be taken and the volunteer will call you back.

Duke Police Department. Duke Police, 911, will respond to emergencies by intervening in cases of assault, providing transportation to the Emergency Department, taking reports of an assault, and investigating and participating in the appropriate legal or judicial action.

Safe Space. If you need a safe and confidential place to go on a Friday or Saturday night between 11 P.M. and 7 A.M., Safe Haven, located in the Women's Center at 126 Few Fed, is open and staffed by trained student volunteers. They will assist you in contacting someone who can help. Additionally, to ensure one's safety, Duke Police can issue a trespass order that requires a dangerous individual to stay away from campus or a particular area of campus.

Medical Concerns. For urgent and immediate medical concerns go directly to the Emergency Department (ED) at Duke Medical Center. You can call Duke Police, 684-2444 or 911, for transportation without having to make a report. For less urgent concerns you may go to the Student Infirmary in Duke South, 684-3367, or schedule an appointment at Student Health in the Pickens Building, 684-3180.

Counseling and Emotional Support. The SASS coordinator provides short-term support, information, advocacy, and referrals to counselors on and off campus who have experience working with survivors. Counseling and Psychological Services (CAPS), 660-1000, provides brief individual counseling/psychotherapy, referrals, and in some semesters, group counseling.

Legal and Judicial Options. You have many legal options including issuing protective orders and pursuing criminal or civil charges. You may also pursue charges under the Duke Judicial Code. For detailed information on all your options, contact Duke Police Department's victim services coordinator, 684-2444, or the SASS coordinator, 684-3897. For detailed information about Duke judicial options call the Student Development Office at 684-6313.

Academic and Residential Life. Being involved in an abusive relationship may interfere with your academic, social, and residential life. If you have concerns about security, feel a need to change your residence or your phone number, or you need academic intervention (an excuse from class, an extension, or a leave of absence), SASS can help you identify the appropriate deans and can accompany you or help you arrange a meeting to discuss your needs.

"THEME" PARTIES AND DECORATIONS

All living groups and cohesive units must adhere to the university safety policies when planning a theme party, event, or meeting. The following are strictly prohibited:

1. **Open flames:** Open fires, cooking fires, campfires, bonfires, candles, incense, or any apparatus, device or machine utilizing an open flame are prohibited.
2. **Party Decorations:** Hay, straw, bamboo, pine straw, dried flowers, sand, or other dried natural materials may not be utilized inside or adjacent to the residence halls. Paper products such as crepe paper, newspaper, paper sacks, or other combustible materials will be sprayed with a flame retardant prior to use.
3. **Electrical:** All electrical equipment to include lights, wires, plugs, cords, connections, and sockets must be UL approved. The use of improvised wiring or tying wiring into the existing electrical services is strictly prohibited.
4. **Animals:** Animal(s), regardless of size or species, are strictly prohibited to attend or participate in any event, party, or meeting.
5. **Water:** Water, waterfalls, pools, spraying water, running water, or utilizing water in any way is strictly prohibited.
6. **Strippers** may not be invited or paid to perform at events sponsored by individual students, residential living groups, or cohesive units.
7. The use of portable charcoal, gas, or electric grills, and gas heaters within 10 feet of all residence halls is prohibited. Grills must be at least 10 feet away from any structure when in use.
8. All trash must be removed by the event host at the close of the event.

Violations reported to the Office of Student Development will be considered serious offenses and living group and cohesive unit officers will be held accountable. Offenses reported will be handled by the appropriate adjudicatory body.

allowed by university safety policies, please contact Bill Boten, OESO-Fire Safety Director at 684-5609, 72 hours prior to the date of the actual event or party.

TRAFFIC REGULATIONS

Motor vehicles must be registered annually at the beginning of the fall semester or, if a vehicle is acquired later, within five days after bringing it to campus. During the first week of fall semester classes, registration will take place in the Bryan Center. All other registration takes place in the Parking Services Office, 2010 Campus Drive, and at other places and times as announced. Students in the School of Medicine and other Medical Center programs will all register through the Medical Center Traffic Office at places as announced. There is an annual parking fee, determined by location and status. Students must present their student identification card.

Upon registration of a motor vehicle, students will receive a copy of the university motor vehicle regulations. Operation of a motor vehicle on the campus is contingent upon compliance with these regulations.

All vehicles parked illegally, including bicycles, motor bikes, motor scooters, and motorcycles parked within the residential hall buildings, may be subject to towing.

USE OF QUADRANGLE SPACE

Reservations for the use of all quadrangle space must be directed to the manager of the Bryan Center. All events scheduled on quadrangles must be registered with the Office of University Life. Only in rare circumstances will the Chapel, academic, or main residential quadrangle areas be made available for events.

Recreational use of the aforementioned quadrangles, in addition to the East Campus main quadrangles, is prohibited. Such use includes, but is not limited to, football and volleyball games, organized frisbee competitions, etc. Students identified as participating in such activities will be referred to the Office of Student Development for possible disciplinary action.

USE OF SEGREGATED FACILITIES

It is university practice not to discriminate in any way on the basis of race, creed or national origin. This statement covers official activities sponsored, financed, and controlled by university personnel and campus organizations, whether these activities are held on or off campus. If they are held off campus, they must not utilize facilities where discrimination is practiced. Naturally the university will not attempt to dictate to individual students, faculty members, or private groups how they should conduct their personal affairs outside the university.

The above policy applies to all social functions sponsored by undergraduate residence hall campus organizations. The failure of student groups to comply with this policy may result in suspension of their social privileges. Repeated offenses by campus organizations could result in the revocation of their charters.

VENDING AND ELECTRONIC GAMES (PIN-BALL, FOOSBALL, ETC.) EQUIPMENT

Only university-owned vending and electric game equipment is permitted in the residence halls. Living groups interested in renting this type of equipment should contact Duke University Vending Services, a service component of the Duke University Stores. Such equipment rented from sources outside the university is prohibited.

VIDEO CASSETTE RECORDERS

Students are advised that Federal copyright law restricts the use of videocassette recorders to private showings and prohibits their public performance.

POLICY ON NONDISCRIMINATION

Duke University does not discriminate on the basis of race, color, national origin, handicap, sexual orientation or preference, gender, or age in the administration of educational policies, admission policies, financial aid, employment, or any other university program or activity. The university admits qualified students to all the rights, privileges, programs, and activities generally accorded or made available to students.



Academic Honesty



Use and Acknowledgement of Sources

THE IMPORTANCE OF ACADEMIC INTEGRITY

Independent learning and the acceptance of individual responsibility are values which are highly regarded among undergraduates at Duke University. It is recognized that personal integrity, and the achievement of genuine scholarship in a community of mutual respect, depend upon the commitments of students as well as faculty to these ideals.

Independent learning sometimes involves one in an investigation of novel data or ideas, and in the formulation of original hypotheses. Yet for most college students, independent learning means the patient search for information, the sifting of criticism which others have published, and the use of this material in the statement and defense of their own conceptions and judgements. From the reading of books, periodicals, and other printed materials, research papers and original compositions are written in partial fulfillment of course requirements. It is therefore of importance that all students understand what is expected of them in using and acknowledging such source materials.

Some entering students may have given little, if any, thought to the issue of academic honesty, for they may have been permitted to copy word for word encyclopedias and other reference works without the use of quotation marks. More perhaps have become accustomed to paraphrasing other peoples' ideas without giving credit to whom credit is due. Some students, who have recognized such common forms of plagiarism and avoided them may have fallen into habits of writing which are nonetheless dishonest. A chief contributing factor is a careless manner of note taking, in which a student's own comments become hopelessly entangled with the words and phrases copied from sources. When notes of this kind are used as a basis for a report, one usually is either unable to identify clearly the ideas which are not one's own, or else, since the sources are not open before him/her at the time of writing, one can easily suppose that no credit need be given. In this way essentially honest students can and do unwittingly undermine their own academic integrity, and that of the community of scholars to which they belong.

It is sometimes protested that educators are too scrupulous in this matter, that there are so many borderline cases as to make the maintenance of standards impracticable. Are not books written to be used by anyone who chooses to rely on them? Do not researchers publish their ideas for others to share? How is one able to distinguish clearly between privileged information and public or common knowledge? Yet thoughtful consideration will lead one to see why honesty is the *sine qua non* of scholarship, the

essential binding principle of any sound academic community and why scrupulosity in this matter is necessary.

A scholar's contributions are his/her ideas and insights; these are their actual achievements. While in college he/she receives recognition for his/her ideas and skills in the form of grades and credit toward graduation and, in some cases, scholarship awards. After graduation, one may be offered fellowships for graduate study or job opportunities on the basis of these accomplishments. Such things are posited on the faith that a scholar's work and achievements are their own, and that one's record indicates accurately the extent to which the student is able to organize in his/her own way that knowledge which is important to the work he/she is fitted to do. Unless the evaluation of each student's accomplishment is based on his real abilities, on work actually done and rewards gained, the student's college record becomes a fraudulent document, and an unfair advantage is gained over other students whose scholarship is honestly represented. Among the many factors essential to the good life of a quality college, commitment to the value of academic integrity is crucial. Students assume individual responsibility in this matter; their failure to do so, for whatever cause, is especially lamentable.

The following is published to provide basic information on the subject. First, there is reproduced a definition of plagiarism which, by furnishing examples, illustrates the improper use of source material. The appendix is a statement written by the chairman of the Undergraduate Judicial Board.

A DEFINITION OF PLAGIARISM*

The academic counterpart of the bank embezzler and of the manufacturer who mislabels his product is the plagiarist, the student or scholar who leads his reader to believe that what he is reading is the original work of the writer when it is not. If it could be assumed that the distinction between plagiarism and honest use of sources is perfectly clear in everyone's mind, there would be no need for the explanation that follows: merely the warning with which this definition concludes would be enough. But it is apparent that sometimes people of good will draw the suspicion of guilt upon themselves (and, indeed, are guilty) simply because they are not aware of the illegitimacy of certain kinds of "borrowing" and of the procedures for correct identification of materials other than those gained through independent research and reflection.

The spectrum is a wide one. At one end there is a word-for-word copying of another's writing without enclosing the copied passage in quotation marks and identifying it in a footnote, *both* of which are necessary. (This includes, of course, the copying of all or any part of another student's paper.) It hardly seems possible that anyone of college age or more could do that without clear intent to deceive. At the other end there is the almost casual slipping in of a particularly apt term which one has come across in reading and which so admirably expresses one's opinion that one is tempted to make it personal property. Between these poles there are degrees and degrees, but they may be roughly placed in two groups. Close to outright and blatant deceit—but more the result, perhaps, of laziness than of bad intent—is the patching together of random jottings made in the course of reading, generally without careful identification of their sources, then woven into the text, the cement to hold the pieces together. Indicative of more effort and for that reason, somewhat closer to honesty, though still dishonest, is the paraphrase, an abbreviated (and often skillfully prepared) restatement of someone else's analysis or conclusion, without acknowledgement that another person's text has been the basis for the recapitulation.

*From *The Logic and Rhetoric of Exposition*, Revised edition, by Harold C. Martin and Richard M. Ohmann, reprinted by permission of publisher, Holt, Rinehart and Winston, Inc., copyright 1963.

The examples given below should make clear the dishonest and the proper use of source material. If instances occur which these examples do not seem to cover, conscience will in all likelihood be prepared to supply advice.

THE SOURCE

The importance of the Second Treatise of Government printed in this volume is such that without it we should miss some of the familiar features of our own government. It is safe to assert that the much criticized branch known as the Supreme Court obtained its being as the result of Locke's insistence upon the separation of powers, and that the combination of many powers in the hands of the executive under the New Deal has still to encounter opposition because it is contrary to the principles enunciated therein, the effect of which is not spent, though the relationship may not be consciously traced. Again we see the crystallizing force of Locke's writing. It renders explicit and adapts to the British politics of his day the trend and aim of writers from Languet and Bodin through Hooker and Grotius, to say nothing of the distant ancients, Aristotle and the Stoic school of natural law. It sums up magisterially the arguments used through the ages to attack authority vested in a single individual, but it does so from the particular point of view engendered by the Revolution of 1688 and is in harmony with the British scene and mental climate of the growing bourgeoisie of that age. Montesquieu and Rousseau, the framers of our own Declaration of Independence, and the statesmen (or should we say merchants and speculators?) who drew up the Constitution have re-echoed its claims for human liberty, for the separation of powers, for the sanctity of private property. In the hands of these it has been the quarry of liberal doctrines; and that it has served the Socialist theory of property based on labor is final proof of its breadth of view.

CHARLES L. SHERMAN,
"Introduction" to John Locke,
Treatise of Civil Government and A Letter Concerning Toleration.

1. WORD-FOR-WORD PLAGIARIZING

It is not hard to see the importance of the Second Treatise of Government to our own democracy. Without it we should miss some of the most familiar features of our own government. It is safe to assert that the much criticized branch known as the Supreme Court obtained its being as a result of Locke's insistence upon the separation of powers; and that the combination of many powers in the hands of the executive under the New Deal has still to encounter opposition because it is contrary to the principles enunciated therein, the effect of which is not spent, though the relationship may not be consciously traced. The framers of our own Declaration of Independence and the statesmen who drew up the Constitution have re-echoed its claims for human liberty, for the separation of powers, for the sanctity of private property. All these are marks of the influence of Locke's *Second Treatise* on our own way of life.

In this example, after composing half of a first sentence, the writer copies exactly what is in the original text, leaving out the center section of the paragraph and omitting the names of Montesquieu and Rousseau where the text is taken up again. The last sentence is also the writer's own.

If the writer had enclosed all the copied text in quotations marks and had identified the source in a footnote, the writer would not have been liable to the charge of plagiarism; a reader might justifiably have felt, however, that the writer's personal contribution to the discussion was not very significant.

2. THE MOSAIC

The crystallizing force of Locke's writing may be seen in the effect his *Second Treatise of Government* had in shaping some of the familiar features of our own government. That much criticized branch known as the Supreme Court and the combination of many powers in the hands of the executive under the New Deal are modern examples. But even the foundations of our state—the Declaration of Independence and the Constitution—have re-echoed its claims for human liberty, for the separation of powers, for the sanctity of private property. True, the influence of others is also marked in our Constitution?from the trend and aim of writers like Languet and Bodin, Hooker and Grotius, to say nothing of Aristotle and the Stoic school of natural law; but the fundamental influence is Locke's *Treatise*, the very quarry of liberal doctrines.

Note how the following phrases have been lifted out of the original text and moved into new patterns:

crystallizing force of Locke's writing
some of the familiar features of our own government
much criticized branch known as the Supreme Court

combination of many powers in the hands of the executive under the New Deal have re-echoed its claims for human liberty . . . property from the trend and aim . . . Grotius to say nothing of Aristotle and . . . natural law quarry of liberal doctrines

As in the first example, there is really no way of legitimizing such a procedure. To put every stolen phrase within quotation marks would produce an almost unreadable, and quite worthless, text.

3. THE PARAPHRASE

Paraphrase: Many fundamental aspects of our own government are
Original: Many familiar features of our own government are
apparent in the Second Treatise of Government. One can safely
apparent in the Second Treatise of Government. It is safe to
assert that the oft-censured Supreme Court really owes its existence
to the Lockean demand that powers in government be kept
a result of Locke's insistence upon the separation of powers;
separate; equally one can say that the allocation of varied
and that the combination of many powers
the New Deal has still to encounter opposition because it is
New Deal has still to encounter opposition because it is
contrary to the principles enunciated therein . . . Once more it
contrary to the principles enunciated herein . . . Again we see
it is possible to note the way in which Locke's writing clarified
the crystallizing force of Locke's writing.
existing opinion.

The foregoing interlinear presentation shows clearly how the writer has simply traveled along with the original text, substituting approximately equivalent terms except where understanding fails him, as it does with "crystallizing," or where the ambiguity of the original is too great a tax on his ingenuity for him to proceed, as it is with "to encounter opposition . . . consciously traced" in the original.

Such a procedure as the one shown in this example has its uses; for one thing, it is valuable for the student's own understanding of the passage; and it may be valuable for the reader as well. How, then, may it be properly used? The procedure is simple. The writer might begin the second sentence with: "As Sherman notes in the introduction to his edition of the *Treatise*, one can safely say . . ." and conclude the paraphrased passage with a footnote giving the additional identification necessary. Or the writer might indicate directly the exact nature of what he/she is doing, in this fashion: "To paraphrase Sherman's comment . . ." and conclude that also with a footnote indicator.

In point of fact, this source does not particularly lend itself to honest paraphrase, with the exception of that one sentence which the paraphraser above copied without change except for abridgment. The purpose of paraphrase should be to simplify or to throw a new and significant light on a text; it requires much skill if it is to be honestly used and should rarely be resorted to by the student except for the purpose, as was suggested above, of personal enlightenment.

4. THE "APT" TERM

The *Second Treatise of Government* is a veritable quarry of liberal doctrines. In it the crystallizing force of Locke's writing is markedly apparent. The cause of human liberty, the principle of separation of powers, and the inviolability of private property—all three major dogmas of American constitutionalism—owe their presence in our Constitution in large part to the remarkable *Treatise* which first appeared around 1685 and was destined to spark within three years, a revolution in the land of its author's birth, and ninety years later, another revolution against that land.

Here the writer has not been able to resist the appropriation of two striking terms—"quarry of liberal doctrines" and "crystallizing force"; a perfectly proper use of the

terms would have required only the addition of a phrase: The *Second Treatise of Government* is, to use Sherman's suggestive expression, a "quarry of liberal doctrines." In it the "crystallizing force"—the term again is Sherman's—of Locke's writing is markedly apparent . . .

Other phrases in the text above—"the cause of human liberty," "the principle of the separation of powers," "the inviolability of private property"—are clearly drawn directly from the original source but are so much matters in the public domain, so to speak, that no one could reasonably object to their reuse in this fashion.

Since one of the principal aims of a college education is the development of intellectual honesty, it is obvious that plagiarism is a particularly serious offense, and the punishment for it is commensurately severe. What a penalized student suffers can never really be known by anyone but the student; what the student who plagiarizes and "gets away with it" suffers is less public and probably leaves a mark on him or her as well as on the institution of which he is a member.

STATEMENT BY THE CHAIRMAN OF THE UNDERGRADUATE JUDICIAL BOARD

Duke University, as a community of scholars, strongly relies upon the standard of academic integrity. Plagiarism, cheating and other forms of academic dishonesty represent a corruption of this integrity and, as such, cannot be tolerated within the community.

The Undergraduate Judicial Board actively affirms the requirement that every undergraduate student at Duke read and understand the Duke University Undergraduate Honor Code and "Statement on Academic Honesty." These statements provide a definitive explication of what is required, in terms of academic honesty, of each student in the community. It has been the sad experience of the board that many cases of academic dishonesty are the result of ignorance as to what exactly constitutes this dishonesty. We firmly urge that each student refer to these statements whenever there is any question about matters of academic honesty. This small investment in time almost certainly outweighs the possibility of badly damaging one's academic career through ignorance or carelessness.

Ignorance of what constitutes academic dishonesty is no excuse for actions which violate the integrity of the community. The board must view any offense of academic dishonesty with the utmost gravity and will determine sanctions commensurate with the severity of the violation. Violations typically will result in a student being dismissed for two semesters. In a community which builds upon the notion of academic integrity, the threat of academic dishonesty represents an intolerable risk.

Appendices



Appendix A

LICENSE TO OCCUPY RESIDENCE HALL SPACE

FULL NAME: _____
(first) (middle) (last) (social security number)

HOME ADDRESS: _____

TERM OF LICENSE: ____ ACADEMIC YEAR 1996-97 or ____ SPRING 1998

DUKE UNIVERSITY HEREBY LICENSES THE UNDERSIGNED TO OCCUPY A RESIDENCE HALL SPACE FOR THE ACADEMIC YEAR INDICATED DURING THE PERIODS WHEN RESIDENCE HALLS ARE OFFICIALLY OPEN FOR OCCUPANCY BY LICENSED STUDENTS. THE OFFICIAL OPENING AND CLOSING DATES OF RESIDENCE HALLS AND RECESS PERIODS DURING THE YEAR WHEN RESIDENCE HALLS ARE NOT OPEN FOR OCCUPANCY ARE PUBLISHED BY THE DEPARTMENT OF HOUSING MANAGEMENT. THIS LICENSE AUTOMATICALLY TERMINATES IF THE STUDENT OFFICIALLY WITHDRAWS, GRADUATES, OR CEASES FOR ANY REASON TO BE A FULL-TIME STUDENT.

I have read the accompanying Terms under which I may occupy residence hall space, and I understand that my continued occupancy is conditional upon my compliance with these Terms and all applicable University Regulations. If I violate these Terms or regulations, the University may revoke this License and may refuse to license me for any occupancy period subsequent to the one provided in this License. I further understand that the Terms of this Agreement and University Regulations are subject to reasonable changes and that, provided I have been notified of such changes, the University may revoke this License should I violate any Term or Regulation in effect during my occupancy under this License.

Nothing in this License shall be interpreted as relief from the responsibility to comply with federal, state, and local law; and violation of any applicable law may be reason for revocation of this License.

In consideration of this License, I agree to pay the University according to the schedule of payments for the type of room I occupy as approved by Duke University, a copy of which has been furnished. I understand that, in the event the University revokes this License because I have violated the Terms of this Agreement or University Regulations, I must vacate the room I am occupying immediately and the University shall not refund any portion of the payment made for the semester in progress. In the event I officially withdraw, graduate, or cease for any reason to be a full-time student, I agree to vacate the residence hall within forty-eight (48) hours. I understand that I will be charged for housing based on the number of days I have occupied a space and will receive a refund for any amount I have paid for housing beyond the time of my departure. The number of days I have occupied the space will be determined according to the date Housing Management inspects the room and confirms that my space has been vacated.

(for Duke University) (Date)

(Signature of Student) (Date)

Space Requested and Reserved

HOUSING ASSIGNMENT:

(room number)

(house)

ROOM DESCRIPTION: Type of Room: Single____ Double ____ Triple____

*Single as Double____ *Double as Triple ____

*Undergraduate students assigned to single rooms converted for double occupancy and double rooms for triple occupancy may be moved to single or double rooms to improve student living conditions and to ensure better use of facilities. The student will be financially responsible for the announced rate for a single or double room as applicable. Vacancies occurring in single rooms used as doubles or in double rooms used as triples will make that (those) remaining occupant(s) financially responsible for the announced rate for a single or double room as applicable for the remainder of the term of the license.

Revised 4/97

TERMS UNDER WHICH DUKE UNIVERSITY LICENSES OCCUPANCY OF RESIDENCE HALL SPACE

The purpose of these Terms is to establish understanding among students who reside in Duke University's residence halls and between these students and the University with regard to use of residential facilities. These Terms are an integral part of the License and are enforceable as covenants and conditions license. Any violation of the Terms could lead to revocation of this License and/or disciplinary action. Occupants are responsible for the actions of their guests

These Terms apply only during periods when the Residence Halls are officially open for occupancy by licensed students. A student in the Residence Halls at any other time may be trespassed from the premises.

I. ELIGIBILITY

Rooms in the Residence Halls are available for assignment to full-time Duke University students who are working towards a degree. Students who withdraw from school, take a leave of absence, or move off-campus must vacate the room within forty-eight (48) hours from the date of such withdrawal, leave, or move.

II. PAYMENTS, RETENTION OF PAYMENTS, AND TERMINATION OF LICENSE

- A. Students pay for their License on a semester basis. Payments are to be made to the Office of the Bursar in accordance with established terms of that Office.

*Undergraduate students assigned to single rooms converted for double occupancy and double rooms for triple occupancy may be moved to normal single or double rooms to improve student living conditions and to ensure better use of facilities. The student will be financially responsible for the announced rate for a normal single or double room as applicable. Vacancies occurring in single rooms used as doubles or in double rooms used as triples will make that (those) remaining occupant(s) financially responsible for the announced rate for a single or double room as applicable for the remainder of the term of the license.

- B. A one hundred dollar (\$100) Residential Deposit must be paid by each new student upon admission to the University. While a student lives in university housing, it is understood and agreed that his/her Residential Deposit shall not be applied to fees. Upon permanently vacating University housing, Duke shall, within ninety (90) days, refund said deposit, less any outstanding fees incurred in accordance with the established University policy. Charges for damages in excess of the Residential Deposit shall be assessed to the student. The Residential Deposit will not be refunded after residential space is reserved to new students who fail to matriculate. Any currently enrolled student will receive a refund of the Residential Deposit written cancellation is received by the Office of Student Development by April 30 for the fall semester and by November 1 for the spring semester.
- C. Each resident is required to obtain a Duke Card and a room key at the time of his/her occupancy. The room key must be returned to the appropriate Service Office within forty-eight (48) hours of vacating the assigned space. Failure to return the key within the 48 hour time period will result in a charge to the student's Bursar's account.
- D. Students may cancel fall housing assignments in order to move off campus through June 30, 1997. No penalty is assessed for students submitting written notice to cancel prior to the last day of spring semester classes. Students submitting cancellation requests after the last day of spring semester classes will forfeit the \$100 residential deposit and the four-year housing guarantee. Beginning July 1, 1997, students may not cancel and move off campus and are responsible for the entire fall semester's rent.
- E. Students may cancel spring housing assignments in order to move off campus through November 1, 1997. No penalty is assessed for students submitting written notice to cancel prior to November 1, 1997. Students submitting cancellation requests after November 1, 1997, will forfeit the \$100 residential deposit and the four-year housing guarantee. Beginning November 2, 1997, students may not cancel and move off campus and are responsible for the entire spring semester rent.
- F. An undergraduate student who is seeking release from a residence hall license must notify the Office of Student Development in writing. Students released from their housing licenses after the period of occupancy has begun will be entitled to a refund of the unused rent. The amount of the unused rent is determined by the date of written notification to the Office of Student Development or the date of vacating the residence hall, whichever is later. In any case, a minimum of \$50 will be retained by Department of Housing Management.

III. RESERVATION, ASSIGNMENT, AND ROOM CHANGE PROCEDURES

- A. The License will not be effective unless accompanied by a signed Food Contract for the same academic year.
- B. Reservations for preregistered upperclass students who have paid Residential Deposits and the fifty (\$50) prepayment of rent will be made in accordance with procedures announced by the Dean. Every effort will be made to assign students in accordance with their preferences; however, the Dean or designee reserves the right to make or change final room assignments if in his/her judgment such reassignments are necessary.
- C. Exchange or transfer of rooms by students may be made only by the following procedure: (1) approval of room change by the Dean or designee, (2) official inspection of vacated room by the Department of Housing Management, (3)

change of keys in appropriate Service Office. In all of the above, the student(s) seeking the change is (are) responsible for making appointments and arrangements. Any unofficial room change may lead to revocation of this License and will not relieve the student(s) involved of the obligation to pay for occupancy, damages, and other costs for the officially assigned room.

- D. Vacancies existing in rooms will be filled by the Dean or designee.
- E. While the majority of problems incurred between or among roommates can be resolved by the students with or without assistance, there are cases in which a stalemate occurs. The Office of Student Development will, in those cases, reserve the right to convene an arbitration board to resolve the problem. The decision of the board is final.
- F. Undergraduate students assigned to single rooms converted for double occupancy and double rooms converted for triple occupancy may be moved to single or double rooms to improve student living conditions and to ensure better use of facilities. The student will be responsible for the announced rate of a single or double room as applicable for the remainder of the term of the License.
- G. Vacancies occurring in single rooms used as doubles or in double rooms used as triples will make the (those) remaining occupant(s) responsible for the announced rate for a single or double room as applicable for the remainder of the term of License.

IV. PROCEDURES, MAINTENANCE, STORAGE, AND DAMAGES

- A. Maintenance will be performed normally on a routine basis; however, corrective, emergency, and preventive maintenance will be assigned as necessary.
- B. The University retains the right to enter the premises without the resident being present to carry out maintenance tasks, to conduct inspections regarding availability of space, and to take care of emergency or any equipment failure which is causing damage or hazard to property or persons. Entry into the room for other reasons will be made during reasonable hours with notice to the assigned occupants.
- C. The Department of Housing Management cleans each room prior to occupancy. Thereafter it is the responsibility of the resident(s) to clean the room. The room is expected to be left in a clean condition by the vacating resident(s). If a room requires extraordinary cleaning after occupancy, the cost will be charged to the resident(s). Housekeeping services will be provided on weekdays during the academic year (excluding holidays) only in common areas of the residence halls. The cost of extraordinary cleaning resulting from a living group's activities will be charged to the living group.
- D. The University is not liable for damage or loss of personal property. **Because the University does not provide insurance, occupants are encouraged to provide their own personal property insurance.**
- E. The University is not liable for the failure or interruption of utilities (including air-conditioning in those residential facilities in which air conditioning units have been installed) or for damages resulting from failure or interruption of utilities or equipment. Residents are not entitled to any compensation or abatement of rent.
- F. Use of nails, screws, tacks, or adhesives which damage walls, furniture, or fixtures is prohibited. Advice on nondamaging ways of hanging artwork and other items is available from Housing Management.
- G. Buildings, building equipment, and furniture repairs or replacements

necessitated by damage beyond normal wear and tear will be billed to the appropriate student(s) or living group in accordance with official procedures published by Housing Management. At the end of each academic year, outstanding living group charges will be divided equally among the group's members and charged to their student ledgers.

- H. The assigned occupant(s) is (are) responsible for reporting to Housing Management defects or damages found in a room within five working days after occupancy. (Forms are provided for the initial inspection by the Department of Housing Management.) The resident(s) of a room will be charged for any damages or modifications found in the room after occupancy unless previously noted on the inspection form.
- I. Each bedroom is equipped with furniture by the Department of Housing Management. The resident(s) of a room will be charged for any furniture missing from that room. Personally owned furniture may be added to the room by a resident provided all residents of that room consent and the furniture is removed by the residents at the end of occupancy. Costs for removing any remaining personal furniture will be charged to the residents.
- J. Students are collectively responsible for care of public areas including furnishings and equipment. Commons furniture owned by Duke University Housing Management may not be removed from its intended location. Anyone doing so may be charged with theft under the Judicial Code. Commons furniture found in bedrooms may be removed by University personnel at the expense of the occupant(s).
- K. Resident students may place empty trunks, luggage, and specialized packing cartons (e.g., stereo boxes) in storage rooms during the effective period of the license at no charge. The University takes no responsibility for the items stored or their contents. Procedures for storage on a fee basis are available from the Department of Housing Management.
- L. Non-University property left in rooms after the license period terminates will be disposed of at the discretion of Housing Management.

V. TERMS AFFECTING RIGHTS, ORDER, HEALTH, AND SAFETY

The following Terms are designed to protect the health and safety and to provide for the comfort and privacy of all students who are licensed to occupy residence hall space. In addition to the following specific Terms, any conduct which reflects a serious disregard for the rights, health, security, and safety of other occupants of the residence halls will be regarded as a violation of the License. Every effort will be made to assign students in accordance with their preferences. However, the Dean reserves the right to make or change final room assignments if in his/her judgment such reassignments are necessary.

- A. Students are entitled to privacy in their assigned rooms as set forth in the University Privacy Policy published in the *Bulletin of Information and Regulations*. Sanitary or safety inspections may be conducted by government officials without notice in accordance with the General Statutes of North Carolina and city and county ordinances. When the residence halls are officially closed during winter recess, inspection of rooms will be made by University officials to ensure that no fire or other hazards exist. Hazardous items will be removed and the student(s) involved will be notified when the buildings are officially opened.
- B. The unofficial use or possession of residence hall keys, including possession of master keys or keys other than those assigned to the student, is prohibited. Keys are not transferable; switching keys with other students is prohibited.

- C. Propping open outside residence hall doors or in any way tampering with the security system of the residence hall is prohibited.
- D. Lost/stolen DukeCards must be reported immediately to the DukeCard Office and a replacement can be obtained. A lost/stolen key must be reported immediately to the appropriate Service Office and a replacement key obtained. A lost/stolen key will result in a charge to the student's Bursar's account. The bedroom door lock will be changed if the resident is unable to present the lost/stolen key to the Service Office within two weeks.
- E. Except in case of fire, firefighting equipment and alarms shall not be tampered with and shall remain in place. Residents must comply with all fire drills and fire regulations. Fires must be reported to Duke Police and Housing Management.
- F. Personally owned air-conditioning equipment and heating is not permitted in residence hall areas. Compliance with any existing University energy conservation policy is required.
- G. Tampering with electrical wiring, including, but not limited to, the installation of direct wired ceiling fans and dimmer switches, is prohibited.
- H. Locks and plumbing are not to be tampered with or changed by occupants.
- I. Damage caused by electrical appliances which are not owned by Duke University is the responsibility of the resident(s).
- J. Waterbeds are prohibited.
- K. In accordance with North Carolina General Statute 14-269.2, no firearms, explosives, fireworks, highly inflammable materials, or any articles which may be used as offensive weapons may be in the residence halls or on the campus. This includes knives, slingshots, clubs, mace, pellet guns, rifles, BB guns, and all firearms and items of like kind.
- L. Animals, including, but not limited to, birds and reptiles, are not allowed in or around the residence halls even for short periods. An extermination, at the resident's expense, will be done if an animal enters the residence halls. Fish are allowed provided they are kept in an aquarium no larger than 25 gallons, the container is cleaned regularly, and no illegal species are kept.
- M. No personal effects may be left in the hallways, stairwells, or common areas of the residence halls; any personal effects so found will be disposed of at the discretion of the Department of Housing Management.
- N. Selling or soliciting in the residence halls, by residents or outsiders, that is either commercial or unrelated to University objectives or activities is prohibited.
- O. A room may be occupied only by the student holding a License for that room. This License may not be transferred by the student to another person. Guests are permitted in student's rooms and common areas for reasonable periods of time subject to the consent of each resident of a room and the specified residence hall visitation policies for each residential unit.
- P. Motor vehicles may not be stored or maintained at any time in any residence hall area. Bicycles may be retained by the owner in his or her assigned bedroom space, but may not be stored in commons, baths, corridors, entrances, or other residence hall spaces. Motor vehicles and bicycles in unauthorized areas will be removed. Students will be required to pay removal fees in order to recover such vehicles or devices used to secure them. The University assumes no responsibility for damage to such vehicles or devices used to secure them.
- Q. Access to roofs and attic space is forbidden.

- R. Boisterous conduct in violation of the University noise policy is prohibited.
- S. Occupants are responsible for the conduct of guests, and any violation of University rules and regulations by a guest shall constitute a violation of same by occupants. Occupants not present during violations will still be held accountable.
- T. Candles, other open flame devices, and incense are strictly forbidden for use inside University facilities except during the official religious ceremonies such as the observance of Chanukah. Those individuals wishing to utilize candles in observance of a religious holiday should contact OESO-Campus Fire and Safety Division to obtain information concerning fire prevention.
- U. Platforms, partitions, or similar structures may not be erected anywhere in the residence halls by students or living groups without the written approval of the Director of Housing Management or designee. Lofts may be erected only if a loft permit is completed and returned to the appropriate Service Office.
- V. Cable television on the Duke Network is provided in the common room of each living group. Connecting televisions in bedrooms to the common room cable or otherwise tampering with the cable is prohibited.
- W. In accordance with the North Carolina State Fire Prevention Code, use of portable charcoal, gas, and electric grills within 10 feet of residence halls is prohibited.

Student Development, Revised 4/97

DUKE UNIVERSITY LICENSE FOR UNDERGRADUATE STUDENTS TO OCCUPY SPACE IN CENTRAL CAMPUS FACILITIES

NAME: _____ SS #: _____

HOME ADDRESS: _____

ASSIGNED LOCATION: _____

PERIOD: from noon _____ to noon _____

Duke University hereby licenses the undersigned to occupy space in the above indicated location and period, subject to the Rules, Regulations, and Other Terms of this Licensing Agreement and all applicable University Regulations. Due to the economics of operating these units, this License will not be revoked to permit students to move to other University housing facilities or to move off campus. *This license automatically terminates if the student officially withdraws, graduates, or ceases for any reason to be a full-time student.*

I have read the Rules, Regulations, and Other Terms of this Agreement, a copy of which has been furnished, under which I may occupy space in University housing and I understand that my continued occupancy is conditional upon my compliance with these terms and all applicable University Regulations. (Attention is especially directed to Part III of the Rules, Regulations, and Other Terms.) If I violate any of these Rules, Regulations, and Other Terms, the University may revoke this License and may refuse to license me for any occupancy period subsequent to the one provided in this License. I further understand that the Rules, Regulations, and Other Terms of this Agreement and University Regulations are subject to reasonable changes. If I have been notified of such changes, the University may revoke this License should I violate any Rules, Regulations, or Other Terms in effect during my occupancy under this License.

Nothing in this License shall be interpreted as relief from the duty to comply with federal, state, and local law, and violation of any applicable law may be reason for revocation of this License.

In consideration of this License, I agree to pay the University according to the schedule of payments for the type of space I occupy as approved by Duke University, a copy of which has been furnished. I understand that, in the event the University revokes this License because I have violated any of the Rules, Regulations, or Other Terms of this Agreement or University Regulations, I must vacate the space I am occupying immediately and the University shall not refund any portion of the payment made for the semester in progress. In the event I officially withdraw, graduate, or cease for any reason to be a full-time student, I agree to vacate the space I am occupying within forty-eight (48) hours. I understand that I will be charged for housing based on the number of days I have occupied that space and will receive a refund for any amount I have paid for housing beyond the time of my departure. The number of days I have occupied the space will be determined according to the date Housing Management inspects the apartment and confirms that my space has been vacated.

(for Duke University)
Date _____

(Signature of Student)
Date _____

Student Development, Revised 4/97

**RULES, REGULATIONS, AND OTHER TERMS FORMING A PART OF THE
LICENSE OF CENTRAL CAMPUS APARTMENTS**

The purpose of these Terms is to establish a mutual understanding among students and the University with regard to use of facilities in the Central Campus Apartments. These Rules, Regulations, and Other Terms are an integral part of this License and are enforceable as covenants and conditions of the License. For further information please refer to the Central Campus Handbook.



I. ELIGIBILITY

Units in the facilities are available for assignment to full-time Duke University students who are working towards a degree. Students who withdraw from school or take a leave of absence must vacate the apartment within forty-eight (48) hours from date of such withdrawal or leave or the official move-out date at the end of the semester, whichever comes first.

II. PAYMENTS:

- A. **Residential Deposits.** Unless previously paid, a student who wishes to reserve a unit in Central Campus Apartments, must submit a Residential Deposit of one hundred dollars (\$100) to the Office of Student Development. While a student lives in University housing, it is understood and agreed that his/her Residential Deposit shall not be applied to housing fees. Upon termination of this License and vacating University housing, Duke shall, within ninety (90) days, refund said deposit, less any outstanding fees incurred, in accordance with the established University policy. Charges for damages in excess of the Residential Deposit shall be assessed to the student. The Residential Deposit will not be refunded after an assignment has been made to students who cancel their assignments, forfeit their assignments, or fail to occupy the residential space except as noted below in Section III(I) and O).
- B. **Keys.** Each resident of a housing unit is required to obtain one key to the unit and one mailbox key at the time of his/her occupancy. The keys must be returned within forty-eight (48) hours of vacating the assigned space. Failure to return the keys within the 48 hour period will result in a charge to the student's bursar's account.
- C. **Housing Fees.** Payments for housing are to be made to the Office of the Bursar before occupancy in accordance with established terms of that office. Payments are to be made on a semester basis.

III. RESERVATION, ASSIGNMENT, SPACE CHANGE, AND CANCELLATION PROCEDURES

- A. The license will not be effective unless accompanied by a signed Dining Plan for the same academic year.
- B. Students applying for spaces in Central Campus Apartments who have paid the required residential deposit will be assigned to the apartments by lottery. Undergraduate students who are presently living in University housing will be assigned to apartments in accordance with procedures published by the Office of Student Development.
- C. The number of students to be assigned to various types of units is established by the Department of Housing Management.
- D. Every effort will be made to assign the students in accordance with their preferences. Because this is not always possible, the Office of Student Development retains the authority to make final space assignments.
- E. While the majority of problems incurred between or among roommates can be resolved by the students, with or without assistance, there are cases in which a stalemate occurs. The Office of Student Development will, in those cases, reserve the right to convene an arbitration board to resolve the problem. The decision of the Board is final.
- F. The exchange or transfer of apartments may be made only upon approval by the Office of Student Development. It is the responsibility of a student vacating space or exchanging apartments to make the apartment ready for the new tenant. The space to be vacated will be inspected by a representative of

Housing Management to relieve the vacating student of financial responsibility for damage occurring after the student vacates. Any unofficial apartment change may be reason for revocation of this license and will not relieve the student(s) involved of the obligation to pay occupancy, damage, and other costs for the assigned space.

- G. The Office of Student Development makes no effort to assign individual bedroom space within each unit. That responsibility is left to the assigned occupants.
- H. Units shall not be occupied in whole or in part by any person other than those regularly assigned by the Office of Student Development. Occupants may not sublet assigned space. Guests are permitted for short periods only, provided all residents of that unit consent.
- I. The Office of Student Development reserves the right to change space assignments if in his/her judgment such change(s) is (are) necessary. This includes relocating a resident from his or her apartment, where there is a vacancy, to another apartment which has a vacancy in order to free a whole apartment for a pair of roommates.
- J. Students may cancel fall housing assignments in order to move off campus through June 30, 1997. No penalty is assessed for students submitting written notice to cancel prior to the last day of spring semester classes. Students submitting cancellation requests after the last day of spring semester classes will forfeit the \$100 residential deposits and the four-year housing guarantee. Beginning July 1, 1997, students may not cancel and move off campus and are responsible for the entire fall semester rent.
- K. Students may cancel spring housing assignments in order to move off campus through November 1, 1997. No penalty is assessed for students submitting written notice to cancel prior to November 1, 1997. Students submitting cancellation requests after November 1, 1997, will forfeit the \$100 residential deposit and the four-year housing guarantee. Beginning November 2, 1997, students may not cancel and move off campus and are responsible for the entire spring semester rent.

IV. PROCEDURES, MAINTENANCE, STORAGE, AND DAMAGE

- A. Maintenance to buildings, fixtures, utilities, equipment, furniture, and furnishings will be performed on a routine basis; however, corrective emergency and preventive work will be performed as necessary.
- B. Prior to occupancy, the Department of Housing Management will clean each vacant unit and will correct deficiencies. An inspection form will be made available for each apartment. Each assigned student should note on the form the condition of the apartment and furnishings at the time of occupancy to prevent misunderstandings. Instructions on the form must be followed.
- C. Occupants shall maintain the demised premises, the furnishings and equipment therein in good condition and shall be responsible for all broken windows and door glass, the failure of plumbing or equipment caused by misuse and other damage beyond normal wear and tear. In such cases, occupants shall be assessed the cost of materials and labor as invoiced by the Department of Housing Management for repairs, replacements, or reassembly. The Department of Housing Management shall have routine maintenance performed and agrees to make such repairs as may be rendered necessary insofar as the cause thereof does not arise from the willful acts or negligence of the occupant(s). No alteration, addition, or painting may be conducted within the premises by the occupant(s).

- D. Locks and plumbing are not to be tampered with or changed by residents. Additional locks may not be installed.
- E. The University retains the right to enter the premises without the tenant teeing present for the following reasons: (1) to take care of an emergency or failure of equipment which is causing damage or hazard to property or persons, (2) to conduct inspections to determine availability of space, (3) to carry out routine maintenance, and (4) to ensure that the furnace has been left on and that the thermostats have not been set below 50 degrees during the break between the fall and spring semesters. Furnaces that have been turned off will be turned on and thermostats will be set at 50 degrees by the Department of Housing Management. Entry into the apartment for other reasons will be made during reasonable hours with notice to the assigned occupant(s).
- F. Non-Duke University Housing Management property left in apartments after the license period terminates will be disposed of at the discretion of Housing Management.
- G. The unofficial use or possession of apartment keys, including possession of master keys or keys other than those assigned to the student, is prohibited.
- H. Lost/stolen keys must be reported immediately to the Central Campus Service Office and a replacement key must be obtained. A lost/stolen key will result in a charge to the student's Bursar's account. The lock(s) to the apartment will be changed if the resident is unable to present the lost/stolen key to the Central Campus Service Office within two weeks.
- I. The University is not liable for damage or loss of personal property. **Because the University does not provide insurance, occupants are encouraged to provide their own personal property insurance.**
- J. The University is not liable for damage, failure, or interruption of utilities. Interruption or curtailment of such services will not entitle the resident to any compensation or abatement of rent.
- K. Furniture or equipment owned by Duke University Housing Management placed in the unit may not be removed from the unit.
- L. Pianos, washing machines, dryers, dishwashers, radio transmitters, external radio or television antennas, and waterbeds are not authorized in these units.
- M. Use of screws, hooks, decals, and adhesive on walls, furniture, or fixtures is prohibited. Small picture hanging nails provided by the Central Campus Service may be used; however, heavy items may not be hung.
- N. Washing of cars in the Central Campus area is prohibited.
- O. No dusting or shaking of mops, brooms, or other cleaning material from the windows, doors, and balconies is permitted.
- P. No fences may be put up around the apartments.
- Q. Outside clotheslines are prohibited.
- R. Access to roofs and attic spaces is prohibited.

V. TERMS AFFECTING RIGHTS, ORDER, HEALTH, AND SAFETY

The following terms are designated to protect the health and safety and to provide for the comfort and privacy of all students who are contracted to occupy units in the Central Campus Apartments. In addition to the Rules, Regulations, and other Terms, any conduct which reflects a serious disregard for the rights, health, security, and safety of other residents will be regarded as a violation of the License.

- A. Combustible materials shall not be stored on the premises. Empty boxes, trash, and other combustibles shall not be stored outside of Central Campus Apartments or Town House Apartments.
- B. Sidewalks, stairways, and entryways must not be used for purposes other than ingress or egress. Bicycles not be left in these areas or other locations where they may cause harm to persons or groundskeeping equipment. Motorcycles must be parked in parking lots.
- C. Nothing shall be hung from balconies, porches, gutters, or stairwells.
- D. In accordance with North Carolina General Statute 14-269.2, no firearms, explosives, fireworks, highly inflammable materials, or any articles which may be used as offensive weapons may be in the Central Campus facilities. This includes slingshots, dubs, mace, pellet guns, rifles, BB guns, and all firearms and items of like kind.
- E. Tampering with electrical wiring, including but not limited to the installation of direct-wired ceiling fans and dimmer switches, is prohibited.
- F. Delivery trucks, automobiles, motorcycles, scooters, and minibikes will not be permitted on lawns and walkways, patios, or stairwells. These vehicles must be parked in legal parking spaces. Motorcycles, scooters, and minibikes may not be stored in the apartment.
- G. Animals, including but not limited to birds and reptiles, shall not be taken into or kept in or about the units. An extermination, at the residents expense, will be done if an animal enters the apartment. Fish are allowed provided they are kept in an aquarium no larger than 25 gallons, the container is cleaned regularly, and no illegal species are kept.
- H. Residents shall maintain the areas adjacent to their apartments in a neat and orderly condition. No refuse, loose paper, cans, bottles, etc. shall be permitted to accumulate around the dwelling units. Any packing cases, barrels, or boxes used in moving must be removed by the occupants who are moving. Bulk refuse containers are located throughout the complex.
- I. Campers, trailers, boats, or similar units may not be parked in the parking lots or other areas at the Central Campus Apartments
- J. Candles, other open flames, and incense are strictly forbidden for use inside University facilities except during official religious ceremonies such as the observance of the holiday of Chanukah. Those individuals wishing to utilize candles in observance of a religious holiday should contact OESO-Campus Fire and Safety Division to obtain information concerning fire prevention.
- K. Any student residing in the apartments who contracts an infectious or contagious disease should immediately report this to the Office of Student Development
- L. Selling or soliciting on the premises of University housing by residents or outsiders, that is either commercial or unrelated to University objectives or activities, is prohibited.
- M. The apartment must be kept in good order and in a sanitary condition.
- N. Laundry rooms will not be used for storage of personal effects, bicycles or the like. The University is not responsible for clothing lost or stolen from Central Campus laundries.
- O. All users of the Central Campus pool must observe swimming pool regulations published by Housing Management. AU persons use the pool at their own risk.
- P. Boisterous conduct in violation of the University noise policy is prohibited.

- Q. Occupants are responsible for the conduct of their guests, and any violation of these Rules and Regulations by a guest shall constitute a violation of same by occupants.
- R. Fire extinguishers are placed in each apartment for the safety of occupants and property. Tampering with this equipment, for use or any purpose other than extinguishing fires, is prohibited. Fires must be reported to Public Safety and Housing Management.
- S. In accordance with the North Carolina Fire Prevention Code, use of portable charcoal, gas, and electric grills within 10 feet of Central Campus Apartments or Town House Apartments is prohibited.
- T. Use of HVAC (heating and air-conditioning) closets as storage space is prohibited.

VI. ENERGY CONSERVATION

All residents must comply with energy conservation programs as established by Duke University for residential facilities.

Student Development, Revised 4/97

Appendix B

JUDICIAL SYSTEM OF DUKE UNIVERSITY

Article I: The Judicial System

1.010 The judicial system of the University shall consist of the University Judicial Board and a Judicial Board for each of the communities hereafter defined (see Articles III and IV)

Article II: The University Judicial Board

2.010 Jurisdiction

- a. The jurisdiction of the University Judicial Board shall be limited to cases arising Vice President out of the Pickets and Protests Regulations and cases involving more than one of the communities as determined by the Vice President for Student Affairs in consultation with the Chancellor and the Chairman of the University Judicial Board.
- b. The University Judicial Board shall have jurisdiction over members of the student body, members of the faculty, and administrative personnel of the University not subject to the Personnel Policy Handbook.

2.015 Filing of Charges; Responsibilities of Vice President for Student Affairs

- a. The Office of the Vice President for Student Affairs shall have responsibility for receiving complaints, conducting investigations, and preferring charges concerning offenses within the jurisdiction of the board. The University Judicial Board shall hear no case without a finding of probable cause made by the Vice President for Student Affairs, whose signature to the charge or charges shall constitute sufficient evidence of such finding.
- b. To assist the Vice President for Student Affairs in the investigation of complaints, the gathering of evidence, and the preparation of charges, investigative and judicial aides may be appointed by the Vice President and shall serve at his/her pleasure and under his/her direction. The number and specific duties of such aides shall be determined by the Vice President for Student Affairs, who shall be fully responsible for all duties performed by them in their capacity as aides.
- c. The Vice President for Student Affairs shall subpoena witnesses as directed by the University Judicial Board.
- d. The Vice President for Student Affairs may delegate all or any portion of his/her duties as regards these judicial procedures to an aide or aides. The Vice President for Student Affairs shall be responsible for the discharge of all duties thus delegated.

2.020 Membership

The University Judicial Board shall consist of a Chairman appointed by the Chancellor, five faculty members (two of whom shall be from the Law School) appointed by the Executive Committee of the Academic Council, and two student members from each of the communities (except in the case of the undergraduate community where there should be four members) elected by each community's Judicial Board. The Chairman of the Board shall select five-person panels consisting of a Chairman and an equal number of students and faculty. Cases referred to the board shall be assigned to the panels in rotation, provided that a member of a panel may, at his/her request, be excused from sitting on a case by the Chairman of the Board, who may appoint a substitute from among the other members of the board. Each panel shall

be known as a "Hearing Committee of the University Judicial Board."

2.030 Terms of Members

Faculty members shall normally serve for two-year terms, but are eligible for reappointment. The terms should be staggered in order to provide continuity. Two of the initial appointees shall be appointed for one-year terms. Student members shall serve for one-year terms, although they may be eligible for re-election. The board has the right to remove any member of the board for cause by a vote of a two-thirds majority of all members. The vacancy shall be filled promptly according to the original procedure.

2.040 Conduct of the Hearing

- a. The hearing will be conducted in private unless the accused requests an open hearing. If any objection is raised to conducting an open hearing in any particular case, the Hearing Committee of the University Judicial Board will decide the issue by majority vote. If the decision is made not to hold an open hearing, the accused shall be informed in writing of the reasons for the decision.
- b. The University and the accused may be represented by an adviser of his/her choice.
- c. The board shall promulgate its own rules of procedure consistent with academic due process and all provisions of this document.
- d. The accused has the right to challenge on the grounds of prejudice any member of the Hearing Committee sitting on his/her case. If an accused makes such a challenge, the Hearing Committee shall deliberate in private to determine whether cause exists. By a majority vote of the members of the tribunal (excluding the member being challenged), a member shall be removed from the case and replaced by a member of the board designated by the Chairman of the Judicial Board. In addition, the accused may exercise a challenge directed at the entire panel, in which case the challenge shall be made to the Chairman of the University Judicial Board, who shall excuse the panel challenged and refer the accused's case to the next panel in rotation.

2.050 The Right of Appeal

- a. In cases heard by the University Judicial Board, there will be no appeal when the accused is acquitted.
- b. A student or administrator who is not a member of the faculty convicted by the University Judicial Board may appeal to the President, or in his/her absence, the Provost, in which case such appeal shall be solely on the record of the proceedings before the Hearing Committee. Argument or appeal shall be on written submission, but the President may, in addition, require oral argument.
- c. A member of the faculty convicted by the University Judicial Board may appeal to the Faculty Hearing Committee authorized under the provisions for Academic Freedom and Tenure of Duke University.

2.060 Status of the Accused

Charges must be prepared without delay following the alleged commission of the offense. Pending final verdict on charges against the accused (including appeal), his/her status shall not be changed, nor his/her right to be on campus to attend classes suspended, except that the Chancellor or Provost may impose an interim suspension upon any member of the University community who demonstrates, by his/her conduct,

that his/her continued presence on the campus constitutes an immediate threat to the physical well-being or property of the members of the University community or the orderly functioning of the University. The imposition of interim suspension requires that the suspended individual shall immediately observe any restriction placed upon him/her by the terms of the suspension. The suspended individual shall be entitled to a hearing within three (3) days before the Hearing Committee on the formal charges. If he/she requires additional time to prepare his/her case before the Hearing Committee, he/she shall be entitled to an informal review of the decision imposing interim suspension by a three-person committee chosen from the members of the University Judicial Board by its Chairman. Interim suspension is an extraordinary remedy which will be invoked only in extreme cases where the interest of the University and members of its community require immediate action before the Hearing Committee can adjudicate formal charges against the suspended individual. If interim suspension is imposed and the accused is later found innocent, the University shall seek restitution as provided by the Hearing Committee with respect to the student's academic responsibilities incurred during the period of suspension.

2.070 Civil and Criminal Courts

Members of the University community may be subject to civil or criminal proceedings in a local court. The Chancellor may initiate legal action seeking injunctive or other civil relief, or file criminal charges, when it is necessary to protect the person or property of members of the University community, or the orderly functioning or property of the University. Such action may be in addition to the filing of formal charges before the University Judicial Board and/or interim suspension.

2.080 Sanctions

- a. A Hearing Committee of the University Judicial Board shall have the power to impose the following penalties upon students:
 1. Expulsion. Dismissal from the University with the recommendation that the person never be readmitted.
 2. Suspension. Dismissal from the University and from participation in all University activities for a specified period of time after which the subject may apply for readmission.
 3. Suspended Suspension. Penalty (2), suspended because of unusual mitigating circumstances. In a period of time specified, conviction before the University Judicial Board, or before one of the community Judicial Boards may result in suspension.
 4. Disciplinary Probation. Placing a student on a probationary status for a specified period of time, during which conviction of any regulation may result in more serious disciplinary action.
 5. Exclusion from participation in extracurricular activities. Without limiting the generality of that penalty, such restrictions might involve participation in any collegiate athletics, or any public participation or performance in the name of the University. However, a Hearing Committee may not exclude a person from performance of the duties of an elective office, but may make such a recommendation to the appropriate organization. This penalty may be imposed by itself or in addition to any of the other enumerated penalties.
 6. Censure. Written reprimand for violation of the specified regulation, including the possibility of more severe disciplinary sanction in the event of conviction for the violation of the same or one of equal seriousness within the period of time stated by the reprimand.

7. Admonition. By an oral statement to the offender that he/she has violated the University rules or has been in contempt of the board.
 8. Restitution. Payment for all, or a portion of property damage caused during the commission of an offense. This penalty may be imposed by itself, or in addition to any of the other penalties.
 9. Fines. Payment of reasonable sums to be determined by a Hearing Committee. This penalty may be imposed by itself, or in addition to any of the other penalties.
 10. Exclusion from social activities where the nature of the violation so indicates including, but not limited to, curfews or other revocation of upperclass privileges.
- b. A Hearing Committee of the University Judicial Board shall have the power to impose the following penalties upon faculty members and administrative personnel not subject to the provisions of the Personnel Policy Handbook.
1. Dismissal. Dismissal or termination of appointment.
 2. Censure.
 3. Admonition.
 4. Restitution.
 5. Fines.

2.085 Other Powers

The Hearing Committee may recommend to the University that it seek restitution with respect to the accused's University responsibilities incurred during a period of suspension or during the period when a hearing has been conducted or shall make such other nonpunitive recommendations with respect to the accused as it shall deem appropriate.

2.090 Records

The board shall promptly arrange a policy of keeping its own records, subject to the University policy on confidentiality.

2.095 Excusal of Members of the University Community from University Obligations

Any member of the University community whose presence is required at a hearing shall be excused from the performance of any University responsibilities which would normally be performed at the time when his/her presence is required before the Hearing Committee.

2.096 Revocation of Probation or Suspended Suspension

In the event that a student has been placed on suspended suspension or disciplinary probation by the University Judicial Board and subsequently is convicted of a violation of a regulation by any other University tribunal, the suspension of his/her suspension or the revocation of his/her probation will not automatically occur. In such a case the student shall be entitled to a hearing being limited to the issue of whether his/her probation should be revoked or whether he/she should be suspended as the result of the original conviction and the conduct which gave rise to the second conviction.

Article III: Community Judicial Boards

3.010 Community Judicial Boards

There shall be an undergraduate community consisting of the undergraduates in Trinity College of Arts and Sciences and the School of Engineering; a Divinity School community; a Law School community; a Medical School community; an Allied Health

community consisting of all degree and certificate (i.e., paramedical, nondegree) students in the School of Allied Health; a School of the Environment community; and a Graduate School community. Except as hereafter provided for the undergraduate community, each community shall have such judicial system as its governing body may provide.

Article IV: The Undergraduate Community

4.010 The Undergraduate Judicial Board

A(1) *Board Established.*

There is established an Undergraduate Judicial Board, hereinafter denoted as the board.

A(2) *Membership.*

The board shall have thirty-six (36) members. Eighteen (18) will be from among the undergraduates, ten (10) will be from among the faculty (Trinity College and the School of Engineering), and eight (8) will be from among the deans in the undergraduate school and college. For purposes of a meeting of the full board, quorum is established at two-thirds (2/3) of the complete membership. Students on leaves of absence under good standing will not be considered in calculation of quorum. Additionally, if a member has been declared in bad standing, the vacated seat will not be counted.

A(3) *Selection of Undergraduate Members.*

Student members of the board will be chosen from among interested rising juniors and seniors as follows:

- a. Interested candidates will apply for positions by completing a written application devised by the Board. Each application, without identification, will be read and evaluated by five (5) members of the current Board.
- b. All candidates will be eligible for a personal interview.
- c. Interviews will be conducted by senior student members of the board and one representative of the Undergraduate Student Government appointed by the Chief Executive Officer of that government.
- d. From among those interviewed, one nominee shall be recommended for each vacancy together with a total of three (3) alternates.
- e. All those nominated are subject to approval by the legislature of the Undergraduate Student Government as advised by a representative of the board in attendance.
- f. At every stage of this process, consideration shall be given to the appointment of a Board membership reflective of the undergraduate student population.
- g. Members who have served for at least one (1) semester during their junior year will become regular members of the board for the following academic year as a matter of course.

A(4) *Selection of Faculty Members.* Faculty members of the board will be appointed by the duly empowered committee of the Arts and Sciences Council through the Dean of Trinity College and by the Dean of the School of Engineering.

A(5) *Selection of the Dean Members.* Appointees will be academic deans in the undergraduate school and college.

- A(6) *Status of Members.*
- a. Faculty vacancies are to be filled by the duly empowered committee of the Arts and Sciences Council and by the Engineering Faculty Council.
 - b. Any undergraduate member of the board who takes a leave of absence while remaining in good standing in the University may resume, upon return, the place previously vacated on the board, provided the student has completed all training and orientation required of board members.
 - c. Students found in violation of the Undergraduate Judicial Code are considered to be in bad standing with the board and will be permanently removed from the board.
- A(7) *Removal of Members.* The board may remove any member for cause by a three-fourths (3/4) majority vote, provided that a quorum is present.
- B(1) *Terms of Undergraduate Members.* Undergraduate members of the board will ordinarily serve for terms not exceeding two years.
- B(2) *Terms of Faculty Members.* Faculty members will serve two-year terms, subject to reappointment upon consent. To insure staggered terms, they may be appointed for a single year.
- B(3) *Terms of Academic Dean Members.* Deans, or their designees, will serve throughout the tenure of their appointments.
- C(1) *Board Organization:* The full board will elect, by majority vote, a Chairman and Vice Chairman, both of whom must be undergraduates.
- C(2) *Board Calendar.*
- a. *Regular Terms.* The board or parts thereof will ordinarily hear and dispose of all pending cases in which charges have been preferred during the regular fall and spring semesters, and following the end of spring semester.
 - b. *Summer Session Terms.*
 - 1. The Chairman will ascertain the local availability of board members for summer session service and those within a 200 mile radius who may be invited by the Judicial Officer to serve at University expense.
 - 2. The Chairman of the Undergraduate Judicial Board will provide the Judicial Officer with a roster of board members available for service on the Undergraduate Judicial Board during all or any portion of the summer sessions.
 - 3. The Judicial Officer will constitute a five (5) member Hearing Committee from this list, appoint a chairman and provide an ordinary hearing committee including at least one (1) faculty member and two (2) students.
 - 4. If the number of student members drawn from the rosters provided under C(2)(b).(2) above is insufficient to constitute the hearing panel provided for in C(2)(b).(3) above, the Judicial Officer, with consent of the Chief Executive Officer of the Undergraduate Student Government, will appoint the necessary number of students drawn from the undergraduate student body.
 - 5. The Summer Session Hearing Committee will function in the same manner and with the same procedure as a Regular Term Hearing Committee, except that the accused may not enjoy more than one (1) peremptory challenge.

C(3) *Duties of Officers.*

- a. The Chairman, Vice-Chairman, or their designee, will preside over any meeting of the board or any meeting or hearing of a part thereof.
- b. The Chairman will maintain a roster of available members for the regular and summer session terms. See C(2).
- c. The Chairman and the Judicial Officer or his/her designee will prepare a "Semester Report of the Undergraduate Judicial Board" to be issued in January and May. It will be a statistical survey designed to order cases: by volume, classification, disposition, and current status (e.g., filed, pending, heard, or on appeal).
- d. The Office of Student Development will prepare and issue an "Annual Report of the Undergraduate Judicial Board" to be compiled following adjournment of the board at the end of the spring semester. The contents will contain:
 1. A listing, by types of cases, of all completely adjudicated cases.
 2. A statistical survey of the business of the board during the preceding academic year.
 3. A commentary on that business.
 4. Any recommendations which the board wishes to make.
 5. The "Annual Report" will be released prior to new student orientation in the fall semester.
- e. The Chairman and/or Vice-Chairman, as well as a representative of the Office of Student Development, will attend one meeting of the Academic Council at the beginning of either semester to discuss the concerns of the board in relation to the faculty and the concerns of the faculty in relation to the board.
- f. Representatives of the Undergraduate Judicial Board and the Honor Council should consult regularly on issues related to academic integrity.

D(1) *Hearing Panel Organization.* Hearing panels will consist of five (5) or seven (7) members as assigned by the Judicial Officer in consultation with the Chairman or Vice-Chairman. Five member hearing panels shall consist of three (3) undergraduates, one (1) faculty member, and one (1) academic dean. Seven member hearings panels may be appointed and shall consist of four (4) undergraduates, two (2) faculty members, and one (1) academic dean. The Chairman, Vice-Chairman, or designee shall preside over each panel.

D(2) *Substitution of Hearing Panel Members.* Any member of a panel may, at his or her request, be excluded by the Chairman of the Board from sitting on any case. The Chairman of the Board will thereupon appoint a substitute member from among the relevant class of members of the board.

E(1) *Jurisdiction.* The board will exercise jurisdiction over cases:

- a. In which the accused is a named undergraduate student
 - currently enrolled in, or
 - not yet matriculated to, or
 - readmitted to and not yet matriculated to programs of the undergraduate college or school.
- b. In which the accused is a residential or nonresidential cohesive unit, as represented by an officer or regular member.
- c. Which fall without the jurisdiction of the University Judicial Board.
- d. Which fall within the classification of offenses stipulated in the Judicial

Code of the undergraduate community (see pages 43-46) and the University regulations and Policies (see pages 46-75) in this bulletin.

F Functions of the Judicial Officer.

F(1) The Judicial Officer or designee is responsible for receiving complaints, conducting investigations, gathering evidence, and preparing and preferring charges relating to offenses within the jurisdiction of the board.

F(2) The Judicial Officer may appoint assistants, in such numbers and for such duties under his/her supervision in order to faithfully execute his/her responsibilities, as the Dean shall deem convenient and useful.

F(3) The Judicial Officer is responsible for maintenance of the records of the board. These records include:

1. A public permanent precedent file provided by panels. It consists of abstracts specifying charges, facts, case dispositions and rationales for such dispositions. Identification of the party or parties, as well as of witnesses, will be omitted.

2. A permanent confidential case file.

F(4) The Judicial Officer or his/her designee, jointly with the board, is responsible for recruitment, training, supervision, and direction of a staff of advisors available to accused students.

G Prehearing Procedures. Upon receipt of a complaint, the Judicial Officer or duly appointed assistants will:

G (1) Promptly assemble and examine all evidence either material or relevant to the allegation in which task the Dean or the Dean's assistant shall enjoy prompt and full cooperation from all parties concerned. This investigatory process may include, but is not confined to:

- a. Receipt of any oral and/or written evidence including documents and records.

- b. Interviewing the accused which interview must begin with notification by the Dean or assistant of: a right to remain silent, a right to an advisor as defined herein, a right to waive knowingly one or both of these rights.

- c. Interviewing any holder of evidence.

- d. Receipt from the accused of a written statement submitted in his or her behalf which document will become part of the case record.

G(2) Promptly determine on the basis of the preliminary investigation whether or not there exists probable cause for believing that the accused person committed the alleged act(s).

G(3) The Judicial Officer is responsible for finding of probable cause. In determining whether to prefer charges against any accused, the Dean will consider:

- a. *Civil or criminal proceedings completed.* If, in the judgment of the Judicial Officer, any civil or criminal liability the accused may have already incurred by reason of the action of any civil or criminal tribunal adequately vindicates the interest of the University in punishment of the accused, the University shall have the option to not prefer charges against the accused. The Dean shall, however, enter into the record the finding of probable cause and reasons for not preferring any charge. Should any criminal proceeding result in a felony conviction, the University, through the Offices of Student Affairs and the student's

Academic Dean, reserves the right to summarily dismiss the convicted student.

- b. *Civil or criminal proceedings pending.* If any civil or criminal action is pending in any civil or criminal tribunal, and, in the judgment of the Judicial Officer, prompt trial before the Judicial Board would be prejudicial and unreasonably burdensome to the accused in respect to the civil or criminal tribunal proceedings, notwithstanding the finding of probable cause, the Judicial Officer may defer preferring any charge. In making this determination, the Dean will consider the nature of the offense, the nature of the defense that may be offered in either the civil, criminal, or University proceeding, the punishment that may be visited on the accused in either proceeding, the likely delay in the civil or criminal proceedings, any possible impairment of the accused's ability to defend him/herself in either proceeding by reason of its contemporaneous pendency and the preservation of general peace and order within the University community. If, after a finding of probable cause, the Judicial Officer decided either to defer preferring charges or definitely to abandon them in the situations covered by this paragraph, the Dean shall, however, enter into the record the finding of probable cause and reasons for deferring or abandoning the preferring of charges.
- c. *Civil or criminal proceedings in future.* If any civil or criminal action is threatened or likely, the Judicial Officer will be governed by the same considerations set forth in paragraph (b.), and in addition by the degree of likelihood of civil or criminal proceedings against the accused. If, after a finding of probable cause, the Judicial Officer decided either to defer preferring charges or definitely to abandon them, in the situations covered by this paragraph, the Dean shall nevertheless enter into the record the finding of probable cause and reasons for deferring or abandoning the preferring of charges.

G(4) In circumstances so warranting under G (3) a.-c. the sanction of interim suspension may be invoked. (See K (13)).

G(5) *Referral.*

- a. The Judicial Officer may refer the case to the appropriate agency for resolution if that officer finds that the case, whether or not probable cause exists, falls without the board's jurisdiction.
- b. At any time prior to imposition of verdict and sanction, any member of a panel may object to further consideration of the case on grounds that the board lacks jurisdiction. Thereupon the panel, in consultation with the Judicial Officer, must resolve the jurisdictional question raised. The decision of a majority of the hearing panel members will be final, and the case will be either retained by the panel or be referred to the appropriate agency for disposition.

G(6) Terminate action and report this fact if:

- a. No probable cause is found.
- b. After examination of the Undergraduate Judicial Code and the University Regulations, it is determined that commission of the alleged act does not violate any provision(s) found in the duly promulgated codes, rules, and regulations of the University.
- c. In the event that the Judicial Officer should refuse or fail for any reason to receive complaints and/or conduct investigations, and/or find

probable cause and/or prefer charges, an aggrieved party may appeal such action or inaction on grounds of new or different evidence previously unavailable. This step may be made by filing with the Chairman of the Board a typed petition entitled: "Petition to Find Probable Cause." Upon receipt of this petition, the Chairman of the Board will direct the Dean or will unilaterally appoint an investigator to find facts on the basis of which a full seven (7)-member hearing panel may determine the existence of probable cause sufficient to warrant a regular hearing in due course.

d. It is determined that the Board lacks jurisdiction over the case.

G(7) *Probable Cause Notice: Undergraduate Judicial Board Hearings.* If probable cause is determined to exist, the Judicial Officer will promptly draw up a written notice to be transmitted to the accused together with a summons to appear for a panel hearing at the time and place specified. The notice will include:

a. The charges.

b. Referral to the relevant provision(s) of the Judicial Code, rules and regulations, and procedural rights.

c. Any additional evidence produced during the investigative process.

d. Any other material which the board may instruct the Judicial Officer to supply the accused.

e. The signature of the Judicial Officer or appointed assistants.

f. List of members of the panel designated to hear the case.

G(8) *Probable Cause: Administrative Hearings.* Should the Judicial Officer determine that either the nature or related extenuating circumstances of a case renders it amenable to the administrative hearing alternative provided for in H(I)(b.), a written notice will include explicit notice of the availability of such forum to an accused who still may opt for his/her right to a formal hearing before the Undergraduate Judicial Board. Students may waive their right to written notice and elect to have their cases resolved immediately. All decisions are subject to appeal.

G(9) Prepare a written report containing a copy of the probable cause notice (G(8)), all evidence gathered in the preliminary investigations, with its sources and statement of the rights of the accused. Nowhere in this report will a personal opinion be expressed as to the merits of any evidence, or as to the guilt or innocence of the accused. However, where there are conflicts in the evidence the Dean may draw the attention of the panel to them. The report shall become a part of the written record of the hearing.

G(10) Subpoena witnesses as deemed appropriate or as directed by the Chairman of the hearing panel.

H(I) *Administrative Hearings.*

a. In all nonacademic violations, the accused may request and/or accept the offer to have his/her case be heard by the Judicial Officer and/or that officer's designee(s) as specified in G(8). In fixing the sanction, the Dean or designee(s) is(are) governed by all penalties enumerated in Section K of the code.

b. The Judicial Officer and/or that officer's appointee(s) will confer at the earliest convenient time with an accused who met the requirements specified in G(8).

- I *Undergraduate Judicial Board Prehearing: Information and Procedures.*
- I(1) *Charge required.*
- a. No case may be heard by the board in the absence of a finding of probable cause by the Judicial Officer and a clear statement of the charges against the accused or by direct petition to the board. (G(6)c) and G(7)
 - b. The Dean's signature on the Probable Cause Notice (G(7)) attests to a sufficiency of inculpatory evidence, existence of the board's jurisdiction, and the completeness of the charges.
- I(2) *Hearing Schedules.* The hearing, based on contents of the Probable Cause Notice (G (8)) will take place speedily, ordinarily within thirty (30) days following presentation of charges to the accused.
- I(3) *Notice.* The accused will be given at least forty-eight (48) hours notice prior to the hearing or prior to continuation of a hearing recessed under J(8) subject to waiver as provided for in I (4).
- I(4) *Waiver.* The accused may waive by a signed written statement or by recorded verbal consent during the hearing the notice and/or the forty-eight (48) hour rule with reference to I (3) above and I(11)b) below.
- I(5) *Continuances.* Should the accused desire additional time to prepare his or her defense, a petition to that effect may be directed to the Chairman of the Board not less than twenty-four (24) hours prior to the scheduled hearing. In the Chairman's discretion, the accused may be granted a hearing delay of reasonable duration.
- I(6) *Contempt.* A willful or deliberate action on the part of the accused to impede, obstruct, unduly delay, or interfere at any stage with, in any manner, the proceedings then or thereafter before or potentially before the board may be deemed an act or acts in contempt of the board as determined by a majority of the relevant panel after issuance of a "show cause" order and in a separate regular proceeding held notwithstanding failure of the accused to appear in defense. K(12).
- I(7) *Removal and Challenges.*
- a. Voluntary Removal. Board members may excuse themselves from a hearing panel for any reason (see D(2)).
 - b. Recusal. No person presenting evidence against the accused may at any time sit in judgment upon the accused.
 - c. Challenges.
 - 1. Peremptory (no cause required). The accused may exercise a peremptory challenge directed at not more than three (3) panel members even if a new hearing on an amended charge is required. (J(8)d).
 - 2. For Cause. The accused has the right to challenge on the grounds of prejudice any member of the hearing panel sitting on his/her case. If an accused makes such a challenge, the panel shall deliberate in private to determine whether cause exists. By majority vote of the members of the panel (excluding the member being challenged), a member shall be removed from the case and replaced by a member of the board designated by the Chairman of the Board.
 - a. In addition, the accused may exercise a peremptory challenge directed at not more than seven (7) panel members even if a new hearing on an amended charge is required. (J(8)d).

- b. At the time the accused is informed of the hearing date, he/she shall be presented with a list of the members of the panel designated to hear the case.
- c. If the accused wishes to make a peremptory challenge(s), he/she shall make the challenge(s) in writing to the Judicial Officer within twenty-four (24) hours prior to the notification of the scheduled time of the hearing.
- d. The Judicial Officer will appoint a new member to the hearing panel.
- e. The accused retains the right to challenge for cause whether or not he or she has used the seven (7) peremptory challenges except as noted in C(2)b.

I(8) *Advisor*

- a. *Right to an Advisor.* The accused enjoys the right to have an advisor. The Judicial Officer will maintain a list of approved advisors from which the accused may select or be assigned an advisor. The accused may decline the assigned advisor and may select any other member of the University community except members of the board, or the accused may select no one. (G(1)b).
- b. The function of the advisor is to advise the accused in the preparation and presentation of his or her case, but the advisor may not directly address the panel nor any other participants during the formal hearing proceedings.
- c. Witness or witnesses as defined in I(10)a may request the panel chairman to permit the presence of an advisor during hearing proceedings under conditions enumerated in I(8)a and b.

I(9) *Role of Accused.*

- a. *Presentation of Case.* The accused enjoys the right and will be advised of the right to produce witnesses, introduce documents, and offer testimony in his or her own behalf. The accused may produce no more than two character references, either presented in writing or orally, to the hearing panel prior to the hearing.
- b. *Testimonial Rights.*
 - 1. The accused enjoys the right against self-incrimination, the right to remain silent respecting the charges brought against him/her, before, during, and after the hearing. No inference of guilt may be drawn from the silence.
 - 2. But any evidence pertinent to the charges volunteered by the accused may be used as evidence against him/her.
 - 3. If the accused elects to offer testimony on a specific act of misconduct, he/she waives a right to continued silence, and must answer truthfully all questions pertaining to the act.
- c. *Examination of Witnesses.* The accused will have the right to examine all witnesses in accordance with J(6).

I(10) *Rights of Victims or Moving Parties*

- a. The right to consult with and/or be accompanied by a person of his/her choosing prior to and during a disciplinary proceeding.
- b. The right to review evidence submitted in response to his/her filed complaint. This will not include being provided with copies of written material.

- c. In cases of sexual assault, the right to be notified immediately of the outcome of the hearing. Additionally, the right to be assisted by university officials in his/her option to notify on- and/or off-campus law enforcement agencies and to be informed of available assistance in making reasonable changes in academic and on-campus living situations.

I(11) *Witnesses.*

- a. *Defined:* Any person with direct knowledge relevant to a case pending before the board is a material witness.
- b. *Duty to Appear.* The Judicial Officer may require the appearance of material witnesses or, upon the written request of the complainant and/or the accused, the Dean will require the appearance of such witnesses.
- c. *Notice to.* The Judicial Officer will notify such witness(es) in writing of the time, place, and purpose of their appearance, as well as of the right against self-incrimination.
- d. *Contempt of.* Willful and deliberate failure and/or refusal of any material witness to honor a subpoena authorized by the board and duly served by the Judicial Officer or a representative may be deemed an act in contempt of the board.

I(12) *Discovery.*

- a. *No extrinsic evidence.* In reaching its judgment, a panel will consider only documents submitted into evidence, and the testimony of: moving party(ies), accused, and witnesses at the hearing.
- b. The accused has the right to examine the written statement of any witness which is relevant to the case at least forty-eight (48) hours prior to either the hearing or continuation of a hearing recessed under J(8) subject to waiver as provided for in I(4).
- c. *Confrontation.* The accused has the right to confront any witness who has given a statement relevant to the pending case.
- d. *Excuse priority.* Any student whose presence is required at a hearing will be excused from any other University responsibility which might prevent, impair, or delay his/her presence before a panel, and both the board and the Judicial Officer will assist such students in making satisfactory arrangements.

- I(13) *Closed Hearings.* The hearing will be closed unless the accused requests an open hearing. If any objection to an open hearing is lodged, the panel will decide the issue by majority vote and, if negative, the accused will receive from the panel a written statement of reasons for rejection of his/her request. (1)

J *Hearing Procedure.*

- J(1) *Opening.* The Chairman will open the proceedings by noting the date, identity of the party(ies), the charges, and identity of all panel members. The chairman also will remind all participants that the persons present and testimony presented in the hearing must be kept strictly confidential.
- J(2) *Plea.* The accused will then plead guilty, not guilty, guilty in part and not guilty in part, or move to postpone the hearing for good cause shown.

- J(3) *Report of the Moving Party.* At this time, the Chairman may invite the moving party(ies) to make a statement, not to exceed five (5) minutes, summarizing the essential facts and expressing opinions thereon. At any point prior to this stage of the hearing, the moving party(ies) may decline such invitation.
- J(4) *Case for Accused.* The Chairman of the panel will request the accused to present his or her case (See I (7) c (1) and I (7) c (2), I(8)b, I(9)). The accused may waive this right by a verbal declaration (See I(9)b (3)).
- J(5) *Witnesses.*
- a. The Chairman of the hearing panel may sequester witnesses to appear consecutively or direct them to appear before the panel simultaneously.
 - b. The accused may call and direct questions to witnesses as prescribed in I(9)a and c, respectively.
 - c. The panel may call and question witnesses.
- J(6) *Examination of Witnesses.*
- a. Under the supervision of the panel chairman, the accused may question directly any witness.
 - b. The moving party or the accused, with or without the advisor's assistance, may submit questions in writing to the Chairman of the hearing panel before or during the proceedings, or the Chairman may, upon verbal request, allow questions to be redirected after being asked verbally.
 - c. The Chairman must ask such question(s) so submitted unless he/she deems them unfair and/or irrelevant and/or purely capricious.
 - d. A copy of the written questions will be appended to the record.
- J(7) *Evidentiary Rules.*
- a. All evidence which the panel considers relevant will be admitted including hearsay and expressions of opinion.
 - b. Wherever possible oral testimony rather than written statements should be presented.
 - c. Statements made by unidentified witnesses or those absent at the hearings, neither of which can be confronted by the accused, may not constitute a sole or substantial basis for conviction.
 - d. No evidence obtained through unlawful search and seizure or in violation of the University Statement on the Privacy of Students' Rooms and Apartments will be admissible at the hearing.
- J(8) *Recess and Termination of Hearings.*
- a. The Chairman may recess hearings for a short duration of time in order to facilitate the work of the panel.
 - b. By vote of a majority of the panel members, hearings may be recessed for an extended duration of time in order:
 - 1. to accommodate extraordinary circumstances such as personal emergencies.
 - 2. to acquire additional evidence or testimony (See I(11) b).
 - 3. to provide adequate time for considering and setting sanctions.

- c. A witness or accused enjoys the right to a brief recess after a lapse of one (1) hour from commencement of the official record as provided for in J(14)a.
 - d. However, no recess may be declared for the purpose of amending the original charges against the accused. If it is determined during the hearing and prior to verdict and judgment that the charges must be amended,
 - (1) with the unanimous consent of the hearing panel and the agreement of the Accused, the charge(s) may be amended and the hearing may continue, or
 - (2) without the unanimous consent of the hearing panel or the agreement of the Accused, the hearing must be terminated without prejudice and the procedures set forth in Section I reinstated.
- J(9) *Individual Student: Status of Accused Pending Verdict and Appeal (Interim Suspension).* Pending verdict on charges (including appeal) against the accused, the status as a student cannot be changed, nor the right to be on campus or to attend classes suspended, except as provided for by the interim suspension rule K(12) or by issuance of a temporary restraining order K(13).
- Group: Status of Accused Pending Verdict and Appeal (Interim Suspension).* Pending verdict on charges (including appeal) against the accused, the status of a group may be modified if the group has been charged with a violation which jeopardized the health and/or safety of an individual or individuals or which substantially disrupted the peace and order of the university community. The immediate imposition of a status modification may be made by the panel hearing the case or by the Judicial Officer.
- J(10) *Verdict and Sanction.*
- a. After the hearing closes, the panel will consider its verdict and sanction in closed session.
 - b. The verdict is a determination of guilt or innocence. A guilty verdict is based on the existence of clear and convincing evidence that the accused committed the act(s) alleged in the charge.
 - c. The sanction is a statement of the punishment imposed drawn from those enumerated in Section K below.
 - d. Verdict and sanction will be determined by a majority vote of a panel except that any judgment of expulsion (see K(1)) or suspension (see K(2)) must be concurred in by not less than four (4) members of a five (5) member panel nor less than five (5) members of a seven (7) member panel.
- J(11) *Special Master.* At any stage in the proceedings, involving complicated technical or professional subject matter, and at the request of any party or any or all members of a panel, a special master may be appointed by the Chairman of the Board in consultation with the Judicial Officer. The special master will render advice to the panel. On the motion of any party or any member of the panel proceedings may be recessed pending the receipt of the special master's report.
- J(12) *Rehearing.* A panel by a majority vote may decide to rehear a case in which significant new evidence can be introduced in behalf of the accused.

J(13) *Notification of Verdict and Sanction.*

- a. The Chairman of the panel will promptly inform in writing the Judicial Officer of the decision of the panel, but initial notification may be oral followed by the written abstract as required by J(14)b.
- b. The Chairman of the panel or the Judicial Officer shall promptly notify the defendant of the verdict and sanction imposed, and shall, at the same time, inform him or her of rights of appeal.
- c. At the request of the moving party(ies), the Judicial Officer may, but is not required to, inform that person or persons of the panel's verdict and/or sanction. In cases of sexual assault, however, victims will be informed of the board's decision as required by law.

J(14) *Record:*

- a. Tapes: A separate tape recording will be made for each hearing, clearly labelled, and retained for three (3) years.
- b. Abstract: A written abstract of each case will be made by completion of a "Hearing Committee Report Form" signed by the panel chairman.

K *Sanctions.* The board is empowered to impose singly or in combination penalties, including, but not limited to, those from the following: four (4) classes without regard to personal hardship (see L. Appeal). Also, sanctions may be compounded for subsequent violations of the undergraduate judicial code.

CLASS I

K(1) *Expulsion.* Dismissal and permanent removal from the University without possibility of readmission or reinstatement. University censure automatically applies.

K(2) *Suspension.*

- a. Under the voting rules set forth in J(10)d, dismissal from membership in the University for a specified period of time, ordinarily including the current semester and the next succeeding one, and such additional semesters as deemed appropriate by the panel.
- b. The privilege of a residential or of any other cohesive unit to exist at Duke University may be suspended or revoked.
- c. Readmission or reinstatement as a student or residential or cohesive unit in good standing is contingent upon satisfaction of any conditions stated in the original sanction.
- d. Upon a student's readmission to and matriculation in the University or the reinstatement of a residential or cohesive unit to the University, the student or residential or cohesive unit is placed on disciplinary probation K(4) for a specified period of time.
- e. As suspension constitutes an involuntary withdrawal from the University, an entry to that effect is made on the student's permanent academic record or the residential or cohesive unit's citizenship record for the duration of the suspension.
- f. Residential or cohesive units may be suspended for a specified time period from one or more enumerated activities sponsored, cosponsored, performed by, or attended by said residential or cohesive unit members.
- g. University censure (Class II) may be applied as determined by the panel.

- K(3) *Suspended Suspension.*
- a. For a specified period of time, the penalty of suspension is imposed, but suspended due to the existence of facts deemed mitigating by a panel.
 - b. A disciplinary probation period must run concurrently and may run consecutively with suspension.
 - c. As no involuntary withdrawal actually occurs, no temporary entry to that effect is made on the student's permanent record.
- K(4) *Probation.*
- a. *Disciplinary Probation.* A status imposed on students or residential or cohesive units for a specific period of time during which another violation of the judicial code or violation of any of the conditions of the probation shall result in an augmented disciplinary action, including the possibility of suspension. Disciplinary probation may include a restriction of the student's or residential or cohesive unit's privileges or eligibility for activities.
 - b. *Revocation of Disciplinary Probation.* In the event that a student or residential or cohesive unit has been placed on disciplinary probation by the Undergraduate Judicial Board and subsequently is convicted of violation of a regulation by the University Judicial Board, the revocation of his/her/its probation will not automatically occur. In such a case he/she/it shall be entitled to a hearing before a panel of the Undergraduate Judicial Board, said hearing being limited to the issue of whether his/her/its probation should be revoked as the result of the original conviction and the conduct which gave rise to a second conviction.
- K(5) *Exclusion.*
- a. from public participation or performance in the name of the University other than performance of duties as an elective officer.
 - b. from application for, retention of, or any other possession of a University housing license.
 - c. from access to, use of, and occupation of specified University-owned premise and/or facilities. (Trespass Order).
 - d. from application for, retention of, or any other possession of a traffic and parking permit.
 - e. from application for, retention of, or any other possession of IM privileges.
- K(6) *Warning.* A formal written admonition but which explicitly states the certainty of a more severe disciplinary sanction for conviction of a subsequent violation during a stated period. A warning may be entered on the student's citizenship record or on the residential or cohesive unit's citizenship record at the discretion of a panel.
- K(7) *Restitution.* Payment for all or a portion of injury or damages to person(s) or property caused by commission of an offense.
- K(8) *Fine.* Payment to Duke University of a reasonable sum of money set by a panel which may also impose a community service sanction as provided for in K(9) below.

- K(9) *Community Service.* Specified hours set by a panel during which period a student or residential or cohesive unit will perform in a service capacity at the university or in the Durham community.

CLASS II

- K(10) *University Censure.*

- a. Official entry on a student's permanent record, of serious misconduct including both the fact of the censure and the exact nature and circumstances of the offense.
- b. This sanction is never applied unless in combination with serious offenses meriting imposition of sanction K(1)-(2). Censure indicates the seriousness of the offense and the absence of mitigating circumstances.
- c. Application of this sanction requires a separate vote of a panel under J(10)d unless accompanying Expulsion K(1).

CLASS III

- K(11) *Temporary Exclusion.* Exclusion from registration, enrollment, or matriculation at the next ensuing semester, including semesters of summer session or eligibility to graduate from Duke University (Delayed Degree Conferral) pending relief from verdict and sanction by compliance in good faith with the original order, directive, or subpoena. This penalty is ordinarily used in contempt proceedings described in I(6) and I(11)d.

- K(12) *Interim Suspension.*

- a. An extraordinary remedy invoked only in extreme cases requiring immediate action prior to a panel hearing or resolution of an appeal.
- b. If the Judicial Officer, or designee, deems any student's presence on campus, at any time, to constitute a threat to the general peace and order of the University community and to its several members, that officer may so notify the Dean of the College or School or the Vice-President for Student Affairs, who may, at his or her discretion, suspend the named student from the University for a three (3)-day period pending a hearing before a duly constituted panel of the board.
- c. If the student or board requires a continuance, the interim suspension may be extended by the Dean of the College or School or the Vice President for Student Affairs.
- d. If interim suspension is imposed and the accused is later found innocent, the University will grant restitution with respect to that student's academic responsibilities incurred during the period of suspension.
- e. An interim suspension may be converted to a summary dismissal should the student be convicted of a felony.

- K(13) *Temporary Restraining Order.*

- a. A formal written ex parte order issued by:
 - (1) a duly constituted panel, or
 - (2) the Judicial Officer, or designee, in consultation with the Chairman of the Board where possible, directing a named actor(s) to cease and desist from engaging in behavior deemed contrary to one or more provisions of the Undergraduate Code. (See I(6) and K(12)).
- b. Such TROs are of twenty-one (21) days duration and are renewable under the provisions outlined in K(13)a(2).

CLASS IV

- K(14) *Counseling/Medical Assessment.* If a panel majority believes that a student would benefit from professional counseling and/or a medical evaluation, it may recommend or require a student to seek an assessment from CAPS, Student Health, or other appropriate professional.
- L *Appeal*
- L(1) *Right of Appeal:* Any student or group may appeal the decision of a disciplinary hearing panel to the Appellate Board, hereinafter defined. Majority decisions of the Appellate Board are final.
- L(2) *Exclusive Grounds for Appeal.*
- Procedural errors substantially affecting the rights of the accused.
 - Incompatibility of the verdict with the weight of the evidence.
 - New evidence of a character which may have affected the verdict or sanction.
 - Proven case of extreme personal hardship as a result of the disciplinary action.
- L(3) *Appellate Board:* The Appellate Board shall be comprised of the Vice Provost for Student Services, the Vice President for Student Affairs, and the senior associate dean from Trinity College and the School of Engineering. An Appeal Panel, which represents the Appellate Board, shall be composed of the Vice Provost, the Vice President, and the academic dean in the appellant's college or school.
- L(4) *Appeal Procedures: Appellant*
- Notice of appeal must be in writing and submitted to the Judicial Officer within forty-eight (48) hours after receipt of the verdict and sanction of the disciplinary hearing panel.
 - A written statement clearly and briefly setting forth grounds for appeal, as specified in L(2), must be submitted to the Judicial Officer within seven (7) days after receipt of the verdict and sanction of the disciplinary hearing panel.
 - The appellant may prepare his/her defense with the assistance of an advisor and may at his/her expense make a transcription of the tape of the original hearing.
 - The appellant has a right to make an oral statement to the Appellate Panel to amplify his/her written arguments. The appellant may be questioned at this time about his/her oral statement or written statement; such questioning shall be confined to the issues on appeal. A notation of substantive issues discussed in any such conference shall be incorporated in the record.
- L(5) *Appeal Procedures:*
- The Appeal Panel may not hear testimony *de novo*.
 - The members shall receive documents submitted by the original hearing panel including abstracts, written opinions, and dissents. A tape of the original hearing shall be made available.
 - The members of the Appeal Panel may consult in confidence with other members of the university community as deemed necessary to substantiate the grounds for appeal and to seek clarification of issues raised in the original hearing.

- d. Either the chairman of the Undergraduate Judicial Board hearing panel or members of the Appeal Panel may request a conference between themselves to consider issues arising out of the case. A notation of substantive issues discussed in any such conference shall be incorporated into the record.
- L(6) *Appeal Outcome.* The Appeal Panel, having insured that the appellant's rights have been protected, will submit in writing to the appellant, with a copy to the Judicial Officer, one of the following:
- a. a finding that an appeal of the verdict has merit and therefore is sustained;
 - b. a finding that the appeal has no merit and an affirmation of the action of the original hearing panel;
 - c. a finding that the appeal has some merit due to one of the following circumstances:
 - 1. procedural errors occurred during the original hearing which *substantially* affected the rights of the appellant,
 - 2. new evidence exists which may have affected the verdict or sanction,
 - 3. the alleged offense is deemed to be unusual and the original charge was inappropriate.

[In these instances, the Appeal Panel may modify the decision of the original hearing panel or it may remand the case to the Judicial Officer with a requirement that a new hearing panel be selected to hear the case.]
 - d. a finding that the sanction assessed was excessive, in which case it may assess a sanction which it deems to be appropriate.
 - e. In cases where a hearing panel's verdict and/or sanction is reversed, the hearing panel may request a conference with a representative of the appeal panel responsible for the reversal.
- M *Amendment of Article IV.*
- M(1) Article IV, "The Undergraduate Judicial Board," may be amended at any time by the Vice President for Student Affairs only on the recommendation of a duly appointed judicial review composed of undergraduates, faculty, and deans appointed by and acting under that officer's supervision and direction.
- M(2) All amendments promulgated by the Vice President for Student Affairs shall be effective from and after the date of promulgation.

Appendix C

PICKETS, PROTESTS, AND DEMONSTRATIONS

Statement of Policy. Duke University respects the right of all members of the academic community to explore and to discuss questions which interest them, to express opinions publicly and privately, and to join together to demonstrate their concern by orderly means. It is the policy of the University to protect the right of voluntary assembly, to make its facilities available for peaceful assembly, to welcome guest speakers, to protect the exercise of these rights from disruption or interference.

The University also respects the right of each member of the academic community to be free from coercion and harassment. It recognizes that academic freedom is no less dependent on ordered liberty than any other freedom, and it understands that the harassment of others is especially reprehensible in a community of scholars. The substitution of noise for speech and force for reason is a rejection and not an application of academic freedom. A determination to discourage conduct which is disruptive and disorderly does not threaten academic freedom; it is rather, a necessary condition of its very existence. Therefore, Duke University will not allow disruptive or disorderly conduct on its premises to interrupt its proper operation. Persons engaging in disruptive action or disorderly conduct shall be subject to disciplinary action, including expulsion or separation, and also charges of violations of law.

Rule. Disruptive picketing, protesting, or demonstrating on Duke University property or at any place in use for an authorized University purpose is prohibited.

Hearing and Appeal. Cases arising out of violations of the Pickets and Protests Regulations will be heard by the University Judicial Board, in accordance with the procedures outlined in Appendix B, pages 96-115. The University Judicial Board shall have jurisdiction over members of the student body, members of the faculty, and administrative personnel of the University not subject to the Personnel Policy Handbook. Hearings will be conducted with regard for academic due process. The decision of the University Judicial Board shall be final if the accused is exonerated or if there is no appeal. In other cases, students may appeal to the President, or, in his/her absence, the Provost, in which case such appeal shall be solely on the record of the proceedings before the Hearing Committee of the University Judicial Board. Argument on appeal shall be on written submission, but the President may, in addition, require oral argument.

A Hearing Committee will consist of two faculty members, one dean, and two students. These students will be selected from members of the judicial boards or governments in the undergraduate, graduate, or professional colleges or schools. The Chairman of the Hearing Committee will be designated by its members.

The Hearing Committee will conduct its proceedings in accordance with academic due process.

The decision of the Hearing Committee shall be final if the accused is exonerated or if there is no appeal. In other cases appeal may be taken to the President, in which case such appeal shall be solely on the record of the proceedings before the Hearing Committee. Argument on appeal shall be written submission, but the President may in addition require oral argument.

The procedures for faculty members will follow the arrangements provided under the *Personnel Handbook*.

Amendments. These regulations on pickets, protests, and demonstrations may be changed or amended by the University at any time but any such change or amendment shall be effective only after publication or other notice. These regulations supersede any regulations heretofore issued on the subject.

Appendix D

RULES GOVERNING DRUG VIOLATIONS

I. Rules governing drug violations at Duke University are as follows.

1. Alleged violations of the policy stated in the first paragraph of the drug policy on page 56 will be adjudicated by the Undergraduate Judicial Board or appropriate deans, or in the case of nonstudents, by comparable authorities and their appointed delegates. It is expected that professional judgment will be exercised in referring indicated cases to University health and counseling services in keeping with the second and third paragraphs of the policy on page 56.
2. The two grounds which may constitute occasion for the assessment of penalties are:
 - a. conviction of a member of the University on a drug charge by a court of law.
 - b. a finding with the appropriate University tribunal, in conformity with the principle of due process, of sufficient evidence that a member of the University has violated the drug policy.
3. The maximum penalty to be imposed within the University upon a student for possession or use of marijuana shall be suspension; for the possession or use of other illegal drugs, or the distribution of any illegal drug, the maximum penalty of the University is expulsion. Other members of the University shall be liable to appropriate comparable penalties.

II. Rules governing drug violations of student-athletes at Duke University are as follows.

Duke University prohibits drug use by its student-athletes. Prohibited drugs will include anabolic steroids and other performance-enhancing drugs, narcotics and other illegal drugs, and any other drug banned by the National Collegiate Athletic Association (NCAA) legislation. The NCAA requires every student-athlete to consent to be tested for prohibited drug usage.

Duke University will require student-athletes to submit to testing:

- a. in compliance with NCAA regulations;
- b. as part of a university-sponsored random-testing program; and
- c. when a coach or the Director of Athletics has a reasonable and articulable suspicion that the student-athlete has used a prohibited drug.

A student-athlete who refuses to undertake a test, or tests positive for a prohibited drug, may be denied permission to represent the university in intercollegiate events or to participate in team practices. The student-athlete also may be subject to additional sanctions, including loss of athletically-related financial aid for subsequent semesters.

All testing functions will be performed under contract by a private service.

A student-athlete may appeal a decision to reduce or cancel his or her financial aid to the Appeals Committee of the Athletic Council, which shall grant the student-athlete a hearing.

Duke University is committed to a policy of helping any student-athlete who recognizes that he or she has a drug problem and asks for help. The first time a student-athlete voluntarily seeks help for a drug problem, the appropriate official in the athletic department will provide confidential counseling or other assistance required by the student-athlete, including medical and drug rehabilitation assistance at the University's expense. Unless medically indicated, a first-time drug user will remain eligible to represent the University in intercollegiate events and participate in team practices. His or her coach will not be informed of the drug problem.

If drug use recurs, and a student-athlete again voluntarily seeks help for a drug problem, the appropriate official in the athletic department will endeavor to assist the student-athlete. The matter will be brought to the attention of the Director of Intercollegiate Athletics. The athletic director may determine in his discretion whether medical and drug rehabilitation assistance sought or needed by a repeat user should be paid for by the University; whether the student-athlete will remain eligible to represent the University in intercollegiate events or participate in team practices; whether the student-athlete's coach will be informed of the drug problem; and whether the student-athlete will be subject to additional sanctions, including loss of athletically-related financial aid for subsequent semesters.

Staff members and others employed by the athletic department who have knowledge of the use of a prohibited drug by a student-athlete are under an affirmative duty to report such usage to the student-athlete's coach or the athletic director.

The effective date of this policy is July 1, 1996. Each student-athlete of Duke University will receive a copy of this policy annually.

HEALTH EFFECTS OF ALCOHOL, TOBACCO, OTHER DRUGS

One class of drugs is most frequently used socially or recreationally—the psychoactive drugs. These drugs are used because of the pleasurable feelings and the altered state of consciousness they induce. Psychoactive drugs act on the central nervous system—more specifically the brain. They may increase its activity (stimulants, such as cocaine, crack, amphetamines), decrease its activity (depressants, such as alcohol, barbiturates, tranquilizers), cause the creation of illusions (hallucinogens, such as LSD, peyote, shrooms, PCP), or have a combined effect (marijuana). Every drug has multiple effects on the brain and the body. Addiction to any of these substances is a disease which affects the addict mentally, emotionally, physically, and spiritually. It can also have a profound effect on those closest to the addicted person.

Short Term Abuse

Impaired judgement (violent behavior, physical injuries, accidents), unpredictable mood swings, halitosis, risky sexual behaviors (unplanned pregnancy, impaired sexual response, sexually transmitted diseases), sexual assault, rape, hangovers, increased nervousness, tremors, shortness of breath, reduced energy and stamina, digestive problems (nausea, vomiting, diarrhea, ulcer irritation), dehydration, cardiovascular changes, seizures, loss of consciousness, death.

Long Term Abuse

Systemic Disorders. Increased heart rate, increased or sudden decrease in blood pressure, hyper-activity, decreased oxygen in blood supply to the brain, decreased immune system function, AIDS or hepatitis from needle sharing, reverse tolerance, hemorrhage, delirium tremens (D.T.s) from acute withdrawal, death.

Brain/Central Nervous System Disorders. Short-term memory loss, concentration difficulties, damaged nerve connections, disruption of "chemical messengers."

Mental Health Disorders. Sleep disorders, eating disorders, fatigue, acute or chronic depression, hallucinations, acute psychotic episodes, suicidal thoughts/gestures/actions, personality changes, delusional states, anxiety/panic reactions, psychosis.

Respiratory System Disorders. Painful nosebleeds, nasal erosion, tuberculosis, chronic lung diseases including emphysema and chronic bronchitis, exacerbation of sinus and asthma conditions, increased risk of lung cancer, decreased vital lung capacity.

Digestive Disorders. Ulcers in the mouth, diseases of the gums, inflammation of

the esophagus, stomach, and pancreas, ulcers, cirrhosis, fatty liver disease, alcoholic hepatitis.

Sexual/Reproductive Disorders. Impotence, atrophy of testicles, impaired sperm production, absence of menstrual period, decrease in desire/arousal/performance, birth defects.

Endocrine/Nutrition/Metabolic Disorders. Malnutrition, vitamin/mineral deficiencies, acute gout, obesity, diabetes, decreased testosterone levels in men, appetite disorders, weight gain or loss, impaired immune system.

Skin and Subcutaneous Tissue Disorders. Skin infections, unsightly changes in the skin, dry skin, boils, skin abscesses, itching, increase in skin moles and benign skin, tumors, spider angiomas, edema.

Pregnancy and Fetal Development. Fetal Alcohol Syndrome, low birthweight babies, increased risk of miscarriage, stillbirth, increased risk of Sudden Infant Death Syndrome, brain damage, congenital deformities, addiction in the newborn.

Other Disorders. Prone to cross addiction to other drugs including prescription medications, laxatives, analgesics, and caffeine. Additionally, chronic abusers have an increased incidence of fractures, sprains, burns, lacerations, bruises, concussions, and other traumas.

HELPING RESOURCES FOR ALCOHOL, TOBACCO, AND DRUG CONCERNS

Emergency Phone Numbers

911—Alcohol-related emergencies are often difficult to assess. If there is any question of a student's safety, or the student has: (1) passed out, (2) vomited, (3) consumed most of a fifth of hard liquor in one to two hours, or (4) consumed alcohol in combination with other drugs, **IMMEDIATELY CALL THE STUDENT INFIRMARY'S 24-HOUR PHONE NUMBER: 684-3367**

If an intoxicated student can't be aroused, has suffered an injury, or seems to be in a life-threatening state, get the student to the **DUKE HOSPITAL EMERGENCY DEPARTMENT. THE E.R.'S 24-HOUR PHONE NUMBER: 684-2413**

Duke Police can assist in transporting students to the Student Infirmary or the Emergency Department. **POLICE PHONE NUMBER: 684-2444**

24-hour confidential advice on alcohol or drug-related emergencies can be obtained through the **EMERGENCY CARE PSYCHIATRIC NURSE (DURHAM COUNTY GENERAL HOSPITAL)** at 470-4000; or through **OAKLEIGH TREATMENT** at 470-6600 or **HOLLY HILL CHARTER** at 1-800-422-1840.

INPATIENT TREATMENT

Oakleigh at Durham 309 Crutchfield Street Durham, NC 27704	470-6600
Holly Hill Hospital 3019 Falstaff Road Raleigh, NC 27610	250-7000 1-800-422-1840

OUTPATIENT TREATMENT

Duke Alcoholism and Addictions Program 2213 Elba St. (Civitan Building) Box 3074, Duke University Medical Center Durham, NC 27710	684-3850
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Oakleigh at Durham
309 Crutchfield Street
Durham, NC 27704

470-6600

Holly Hill Hospital
3019 Falstaff Road
Raleigh, NC 27610

250-7000
1-800-422-1840

INDIVIDUAL COUNSELING

Duke Student Health—Substance Abuse Services
Alcohol and Other Drugs—Jeanine Atkinson
Healthy Devil Health Center, 113 House O

684-5771
684-3620, x 325

Duke Alcoholism and Addictions Program
2213 Elba Street (Civitan Building)
Box 3074, Duke University Medical Center
Durham, NC 27710

684-3850

Durham County Substance Abuse Services
705 S. Mangum Street
Durham, NC 27701

560-7500

SUPPORT GROUPS

Alcoholics Anonymous (AA) (286-9499 or 929-1109). AA offers emergency support for alcoholics, in addition to their group meetings. Many have found that the 12 step program is the most helpful method of getting sober. There are AA groups near campus. Call Jeanine Atkinson at 684-5771 for location/date/time.

Narcotics Anonymous (NA) (755-5391). This support group is for recovering drug abusers/addicts, or those who are currently abusing drugs, or members of their families, or friends. The 12 steps are used in this program.

ACOA/AL-ANON (286-0999). An ACOA/AL-ANON group is a self-help for family members group based on the 12-step model which focuses on dealing with the impact of living with or being close to an alcoholic. There are also ACOA/AL-ANON groups in Chapel Hill. The North Carolina Association for Children of Alcoholics is an information and referral service. 1-800-688-4232

Women for Sobriety (489-6078). This women's support group is based on re-establishing self esteem and growth in order to recover from alcoholism. Small, confidential groups are available in this area as well as nationally and internationally.

INFORMATION/EDUCATION

Duke Substance Abuse Program (684-5771). The office of the Substance Abuse Specialist is located at the Healthy Devil in room 113 House O. The program offers a wide variety of information on alcohol, tobacco, other drugs, how to help a friend, decision-making and more. This walk-in service also provides videotapes, films and books. Individual or group consultation, information, assessment and referral appointments can be scheduled by calling the Substance Abuse Specialist at Health Education, 684-5771. Confidentiality is ensured.

Counseling and Psychological Services (660-1000). Counseling and Psychological Services (CAPS) is available for evaluation, consultation, and referral for substance abuse.

North Carolina Alcohol and Other Drug Resource Center (493-2881). Offers an impressive array of free brochures on alcohol and other drugs, plus listings of area

treatment and self-help resources, including information on AA, NA, AL-ANON, NAR-ANON, and other support group meeting places and times.

1-800-COCAINE. An around-the-clock information and referral service, staffed by recovering cocaine addict counselors.

C.S.A.P. (1-800-662-HELP; 1-800-662-9832 for information in Spanish). A 24-Hour hotline maintained by the Center of Substance Abuse Prevention offers confidential information and referral.

N.C.A.D.I. (1-800-729-6668). The National Clearinghouse for Alcohol and Drug Information offers free print information on alcohol and other drugs. Other media may be available for rent or purchase.

Cancer Information Service (1-800-422-6237; 490-1875). Free telephone smoking cessation counseling, materials, support, referrals. Information in Spanish when needed.

American Lung Association (1-919-834-8235). Self help materials available.

Appendix E

DUKE UNIVERSITY REGULATIONS CONCERNING PAYMENTS OF ACCOUNTS

Basic University policy requires that tuition and mandatory fees be paid in full prior to the beginning of each semester whether an invoice has been received or not. As part of the agreement of admission to Duke University, a student is also required to pay all monthly invoices for any additional charges as presented. A payment plan offers an alternative for payment of a portion of the charges billed each year. The *Monthly Payment Option* provides an opportunity to pay tuition, room, and board in ten (10) installments. If full payment or arrangement for payment through the plan is not received, a penalty charge as described below will be assessed on the next monthly invoice and also certain restrictions as stated below will be applied.

Late Payment Penalty Charge. If the "Total Amount Due" on an invoice is not received by its due date, the next invoice will show a penalty charge of 1-1/4 percent per month assessed on the past due balance regardless of the number of days past due. The "Past Due Balance" is defined as the previous balance less any payments and credits received on or before the due date and also less any student loan memo credits related to the previous balance which appear on the invoice. "

Restrictions. An individual will be in default of this agreement if the "Total Amount Due" on the student invoice is not paid in full by the invoice due date. An individual who is in default will not be allowed to register for classes, receive a transcript of academic records, have academic credits certified, be granted a leave of absence, or have a diploma conferred upon graduation. In addition, an individual in default may be subject to withdrawal from school and may have the account referred to a collection agency. If an account is referred to a collection agency, the individual will be responsible for all applicable collection and/or court costs.

Telephone Numbers Frequently Used

ADMISSIONS	684-3214
Baker, Barbara A.-Dean of Student Development	684-6313
Belvin, James-Director of Undergraduate Financial Aid	684-6225
BRYAN CENTER INFORMATION DESK	684-2323
Bryant, Martina-Associate Dean/Social Science/Trinity College	684-2075
BURSAR	684-3531
CAREER DEVELOPMENT CENTER	660-1050
Christmas, William-Director of Student Health	684-6721
Clack, R. James-Director-Counseling and Psychological Services	660-1000
COUNSELING AND PSYCHOLOGICAL SERVICES	660-1000
Cunningham, Bruce-Registrar	684-2813
Dickerson, Janet Smith-Vice-President/Student Affairs	684-3737
Dowell, Earl-Dean of the School of Engineering	660-5389
DSG (Duke Student Government)	684-6403
DUKE POLICE DEPARTMENT	684-2444
ENGINEERING, SCHOOL OF	660-5386
EVENT ADVISING CENTER	684-3084
FINANCIAL AID	684-6225
Friedrich, John-Chairman of Department of Health, Physical Education, and Recreation	684-2202
HOUSING MANAGEMENT	684-5226
HEALTH, PHYSICAL EDUCATION, AND RECREATION	684-2202
INTERCULTURAL AFFAIRS	684-6756
INTERNATIONAL HOUSE	684-3585
Johns, Christa-Assistant Dean/Social Science and Study Abroad/Trinity College	684-2174
Keul, Norman-Assistant Dean/Pre-Majors/Trinity College	684-6217
Lattimore, Caroline-Assistant Dean/Social Science/Trinity College	684-3924
MINISTER TO THE UNIVERSITY	684-2177
Director of Counseling and Psychological Services	660-1000
Nijhout, Mary-Associate Dean/Natural Sciences/Trinity College	684-6536
PAGE BOX OFFICE	684-4444
Shepard, Marion-Associate Dean/Engineering	660-5387
Singer, Kay-Assistant Dean/Natural Sciences/Premed Advisor/ Trinity College	684-6221
Starnes, Marian-Bursar	684-3531
STUDENT AFFAIRS	684-3737
STUDENT DEVELOPMENT	684-6313
STUDENT HEALTH	684-6721
Thomason, Fidelia-Director of Housing Management	684-5226
Thompson, Robert-Dean of Undergraduate Affairs	684-3465
TRINITY COLLEGE	684-3465
UNION	684-2911
Willimon, William-Dean of the Chapel	684-2177
Wilson, Gerald-Senior Associate Dean/Trinity College/Prelaw Advisor	684-2865
Wittig, Ellen-Associate Dean/Humanities/Trinity College	684-5585
EMERGENCY-911	

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bulletin of
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1997-98

Medical Center



The Mission of Duke University

The founding Indenture of Duke University directed the members of the university to "develop our resources, increase our wisdom, and promote human happiness."

To these ends, the mission of Duke University is to provide a superior liberal education to undergraduate students, attending not only to their intellectual growth but also to their development as adults committed to high ethical standards and full participation as leaders in their communities; to prepare future members of the learned professions for lives of skilled and ethical service by providing excellent graduate and professional education; to advance the frontiers of knowledge and contribute boldly to the international community of scholarship; to foster health and well-being through medical research and patient care; and to promote a sincere spirit of tolerance, a sense of the obligations and rewards of citizenship, and a commitment to learning, freedom, and truth.

By pursuing these objectives with vision and integrity, Duke University seeks to engage the mind, elevate the spirit, and stimulate the best effort of all who are associated with the university; to contribute in diverse ways to the local community, the state, the nation, and the world; and to attain and maintain a place of real leadership in all that we do.

bulletin of
Duke University
1997-98

Medical Center

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Duke University does not discriminate on the basis of race, color, national origin, gender, age, handicap, or sexual orientation or preference in the administration of educational policies, admission policies, financial aid, employment, or any other university program or activity. The university admits qualified students to all the rights, privileges, programs, and activities generally accorded or made available to students. For further information, call the university's equal opportunity compliance officer, at 919-684-4736.

The information in the bulletin applies to the academic year 1998-99 and is accurate and current, to the best of our knowledge, as of February, 1997. The university reserves the right to change programs of study, academic requirements, lecturers, teaching staffs, the announced university calendar, and other matters described in the bulletin without prior notice, in accordance with established procedures.

Information that the university is required to make available under the Student Right to Know and Campus Security Acts may be obtained from the Office of University Relations at 684-2823 or in writing to 615 Chapel Drive, Duke University Durham, NC 27708.

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School Of Medicine Calendar 1997-98

First Year (freshmen) Students

Fall Term 1997

August	
13-15	Wednesday-Friday - Begin orientation and 1997-98 academic year
18	Monday, 8:00 a.m. - Begin Block I
October	
9	Thursday, 6:00 p.m. - End Block I
15	Wednesday, 8:00 a.m. - Begin Block II
November	
25	Tuesday, 6:00 p.m. - Begin Thanksgiving holiday
December	
1	Monday, 8:00 a.m. - Classes resume
19	Friday, 6:00 p.m. - End Block II and Fall 1997 Term

Spring Term 1998

January	
5-9	Monday-Friday - Practice course (intensive learning week) and begin Spring 1998 Term
12	Monday, 8:00 a.m. - Begin Block III
19	Monday - Martin Luther King, Jr. holiday
February	
6	Friday, 6:00 p.m. - End Block III
10-13	Tuesday-Friday - Practice course (intensive learning week)
16	Monday, 8:00 a.m. - Begin Block IV
April	
22	Wednesday, 6:00 p.m. - End Block IV and begin spring vacation
May	
4-8	Monday-Friday - Practice course (intensive learning week)
11	Monday, 8:00 a.m. - Begin Block V
July	
4	Saturday - Independence Day holiday
9	Thursday, 6:00 p.m. - End Block V and 1997-98 academic year

Second Year (sophomore) Students

Summer Term 1997

August	
11	Monday, 8:00 a.m. - Begin Practice course, intensive learning period
28	Thursday, 12:00 noon - End intensive learning period

Fall Term 1997

Alternate Schedule for Psychiatry/Cost Effective Care

81 PSC September 2 - October 10

CEC October 13 - October 24

82 PSC October 27 - December 5

CEC December 8 - December 19

September	
1	Monday, Labor Day holiday
2	Tuesday, 8:00 a.m. - Begin classes in sections 81,41
24	Wednesday, 6:00 p.m. - End classes in section 41
29	Monday, 8:00 a.m. - Begin classes in section 42
October	
22	Wednesday, 6:00 p.m. - End classes in sections 81,42
27	Monday, 8:00 a.m. - Begin classes in sections 82, 43
November	
19	Wednesday, 6:00 p.m. - End classes in section 43
24	Monday, 8:00 a.m. - Begin classes in section 44
26	Wednesday, 6:00 p.m. - Begin Thanksgiving holiday

December

- 1 Monday, 8:00 a.m. - Resume classes in section 44
 20 Saturday, 6:00 p.m. - End classes in section 82,44

Spring Term 1998**Alternate Schedule for Psychiatry/Cost Effective Care**

- 81 PSC January 5 - February 13
 CEC February 16 - February 27
 82 PSC March 9 - April 17
 CEC April 20 - May 1

January

- 5 Monday, 8:00 a.m. - Begin classes in sections 81,41
 19 Monday - Martin Luther King, Jr. holiday
 28 Wednesday, 6:00 p.m. - End classes in section 41

February

- 2 Monday, 8:00 a.m. - Begin classes in section 42
 25 Wednesday, 6:00 p.m. - End classes in sections 81, 42 and begin spring vacation

March

- 9 Monday, 8:00 a.m. - Begin classes in sections 82,43
 27 Thursday - Third Year Elective Forms due in Dean's Office

April

- 1 Wednesday, 6:00 p.m. - End classes in section 43
 6 Monday, 8:00 a.m., Begin classes in section 44
 8 Wednesday - Registration Fall 1998, rising third and fourth year students
 27 Monday, 6:00 p.m. - Late registration for Fall 1998
 29 Wednesday, 6:00 p.m. - End classes in sections 82,44

Summer Term 1998**Alternate Schedule for Psychiatry/Cost Effective Care**

- 81 PSC May 4 - June 12
 CEC June 15- June 26
 82 PSC June 29 - August 7
 CEC August 10 - August 21

May

- 4 Monday, 8:00 a.m. - Begin classes in sections 81,41
 27 Wednesday, 6:00 p.m. - End classes in section 41

June

- 1 Monday, 8:00 a.m. - Begin classes in section 42
 24 Wednesday, 6:00 p.m. - End classes in sections 81,42
 29 Monday, 8:00 a.m. - Begin classes in sections 82,43

July

- 4 Saturday - Independence Day holiday
 22 Wednesday, 6:00 p.m. - End classes in section 43
 27 Monday, 8:00 a.m. - Begin classes in section 44

August

- 19 Wednesday, 6:00 p.m. - End classes in sections 82,44

Third Year (junior) and Fourth Year (senior) Students**Summer Term 1997****May**

- 12 Monday, 8:00 a.m. - Begin classes in sections 16,81,41

June

- 7 Saturday, 12:00 noon - End classes in section 41
 9 Monday, 8:00 a.m. - Begin classes in section 42

July

- 3 Thursday, 12:00 noon - End classes in sections 81,42
 4 Friday - Independence Day holiday
 7 Monday, 8:00 a.m. - Begin classes in sections 82,43

August

- 2 Saturday, 12 noon - End classes in section 43
- 4 Monday, 8:00 a.m. - Begin classes in section 44
- 30 Saturday, 12:00 noon - End classes in sections 16,82,44

Fall Term 1997**September**

- 1 Monday, Labor Day holiday
- 2 Tuesday, 8:00 a.m. - Begin classes in sections 16,81,41
- 27 Saturday, 12:00 noon - End classes in section 41
- 29 Monday, 8:00 a.m. - Begin classes in section 42

October

- 25 Saturday, 12:00 noon - End classes in sections 81,42
- 27 Monday, 8:00 a.m. - Begin classes in sections 82,43

November

- 19 Wednesday - Registration for Spring Term, 1998
- 22 Saturday, 12:00 p.m. - End classes in section 43
- 24 Monday, 8:00 a.m. - Begin classes in section 44
- 26 Wednesday, 6:00 p.m. - Begin Thanksgiving holiday

December

- 1 Monday, 8:00 a.m. - Classes resume in section 16,82,44
- 10 Wednesday - Late registration day for Spring Term, 1998
- 23 Tuesday - 12:00 noon - End classes in sections 16,82,44

Spring Term 1998**January**

- 12 Monday, 8:00 a.m. - Begin classes in sections 16,81,41
- 19 Monday - Martin Luther King, Jr. holiday

February

- 7 Saturday, 12:00 noon - End classes in section 41
- 9 Monday, 8:00 a.m. - Begin classes in section 42

March

- 7 Saturday, 12:00 noon - End classes in sections 81,42. Begin spring vacation
- 16 Monday, 8:00 a.m. - Begin classes in sections 82,43
- 25 Wednesday - Registration for Summer Term 1998 - rising fourth year students
- 27 Friday - Third Year Elective Forms due in Dean's Office

April

- 8 Wednesday - Registration for Fall Term 1998 - rising third and fourth year students
- 11 Saturday, 12:00 noon - End classes in section 43
- 13 Monday, 8:00 a.m. - Begin classes in section 44
- 27 Monday - Late registration day for Fall Term, 1998

May

- 9 Saturday, 12:00 noon - End classes in sections 16,82,44
- 16-17 Saturday-Sunday - Graduation activities

Summer Term 1998**May**

- 11 Monday, 8:00 a.m. - Begin classes in sections 16,81,41

June

- 6 Saturday, 12:00 noon - End classes in section 41
- 8 Monday, 8:00 a.m. - Begin classes in section 42

July

- 3 Friday, 6:00 noon - End classes in sections 81,42
- 4 Saturday - Independence Day Holiday
- 6 Monday, 8:00 a.m. - Begin classes in sections 82, 43

August

- 1 Saturday, 12:00 noon - End classes in section 43
- 3 Monday, 8:00 a.m. - Begin classes in section 44
- 29 Saturday, 12:00 noon - End classes in sections 16,82,44

University Administration

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Judy Carter, *Admissions Officer*

Jo J. Hunt, *Administrative Assistant*

Phillip Hofinga, *Student Services Coordinator*

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Audit and Tissue

Clinical chairman of each clinical service and head of each division in service.

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Basic Science Faculty Steering

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Brain Death

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Clinical Cancer Education Program

John M. Falletta, M.D., *Chairman and Director*; Dr. Halperin.

Clinical Sciences Appointments, Promotions, and Tenure

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Clinical Science Faculty Council on Academic Affairs

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Continuing Medical Education

Cynthia Easterling, M.Ed., *Chairman*; Drs. Bennett, Bump, Drucker, Fowler, Grady, V. Johnson, Kenan, Krigman, Lyles, O'Conner, and Spritzer; Ms. Edwards.

Dean's Committee on Minority Affairs

Joanne A. P. Wilson, M.D., *Chairman*; Drs. Carter, Falletta, Gilliam, Harrell, Porter, and Putman; Ms. Johnson; Mr. Adamson.

Duke Comprehensive Cancer Center Clinical Cancer Committee

Drs. Bossen, Brown, Clarke-Pearson, Colvin, Crawford, Falletta, George, Gilbert, Korneguth, Kurtzberg, Paulson, Prosnitz, Richtsmeier, Schildkraut, and Seigler; Ms. Couch, Howard, Robertson, Singletary, and Webb.

Executive Committee of the Medical Staff

Robert Anderson, M.D., *Chairman*; Drs. Armstrong, Blazer, Cohen, Epstein, Frances, Frank, Halperin, B. Haynes, Hammond, Iglehart, Michener, Pizzo, Ravin, Reves, Snyderman, and Woods; Mr. Israel; Ms. Nevidjon.

Executive Committee for Undergraduate Medical Education

Dan G. Blazer II, M.D., Ph.D., *Chairman*; Drs. Dawson, Halperin, Hammes, Kredich, McIntosh, Nevins, Petrusa, Prosnitz, Sheline, Snyderman; Student Representative: Mr. Rothman.

Financial Aid

Stacey R. McCorison, M.B.A., *Director*; Drs. Armstrong, Blazer, and Johnston; Ms. Franklin; Student Representatives: Mr. Pande; Ms. M. Srinivasan; and three OSR representatives.

Hospital Ethics

Jim Travis, Ph.D., *Chairman*; Drs. Galanos and Sugerman and Ms. Burke and Meadows, *Co-Chairmen*; Drs. Alexander, Donatucci, Eisenson, Falletta, Goldstein, Guyton, Hodgins, Kredich, Kenan, Kussin, Lyles, Margolis, Miralles, Puckett, Saltzman, and Schulman; Ms. Alexander, Belcher, Chapman, Lentz, London, Maher, Nead, Nevidjon, Nowak, Reshamwala, Squires, Tart, and Taylor; Messrs. Hertz and Rutherford.

Hospital Infection Control

Daniel J. Sexton, M.D., *Chairman*; Drs. Gruninger, Hall, C. Jackson, G. Jackson, Kirkland, Livengood, McKinney, Sladen, Thomann, and Weitzner; Ms. Bronstein, Cheesborough, Crouch, Dickerson, Edwards, Hendrix, Kessenich, Oden, and Weaver; Messrs. Dennis, Kessler, and Linehart.

Hospital Transfusion Committee

John M. Falletta, M.D., *Chairman*; Drs. Addison, Bredehoeft, Cooper, Hall, Kinney, Murray, Rosse, Telen, and Young; Ms. Abernathy and Rodio; Messrs. Barbieri, Bennett, and Stinson.

Institutional Animal Care and Use Committee

E. Lee Tyrey, Ph.D., *Chairman*; Bruce J. Leone, M.D., *Vice Chairman*; Drs. Abou-Donia, P. Anderson, Bonaventura, Canada, Collins, Crenshaw, Crowder, R. Erickson, Feldman, Fitzpatrick, Friedman, Glander, Glower, Hawk, Hawkins, Hershfield, Kaufman, Kirby-Smith, Krangel, Levin, Linney, Lyerly, McCarty, McClay, McClellan-Green, Meck, Miller, Mills, O'Brien, Rahija, Reimer, Ross, Saling, Schomberg, Skene, Steenbergen, Vaslef, Williams; Ms. Alberts, de Guehery, Dillon, Sigman-Hendricks, Thomas, and Woynicz; Messrs. Gustafson, McCaughan, and Moorman.

Institutional Biosafety Committee

Jack D. Keene, Ph.D. and Wayne R. Thomann, Ph.D., *Co-chairmen*; Drs. Drake, Gilboa, Granger, Hunt, Kohorn, Ostrowski, Pickup, Resnick, and Webster; Ms. de Guehery.

Institutional Committee for Graduate Medical Education

John L. Weinerth, M.D., *Chairman*; Drs. Abramson, B. Alexander, T. Anderson, Andolsek, Barold, Bart, Bentley, Blazer, Bradford, Bressler, Burmeister, Campbell, Carter, Chung, Clifford, A. Coogan, P. Coogan, Copeland, Couchman, Dentz, Dev, Dodd, Drucker, Forbess, Fortney, Gebara, Goldner, Grady, Gutman, Hardaker, Hasson, Hochrein, Ingram, Kahler, Katz, Keith, King, Kinney, D. Kredich, V. Kraus, Lee, Lineberger, Lyerly, Mattioli, McGrath, McSwain, Moreadith, O'Leary, Onken, Pollock, Postel, Puckett, Robertson, Rourk, Scher, Sebastian, Shaddock, Sporn, Talbot, Thel, Waugh, Woods, and Yarger; Ms. Campbell, Hendrix, and Tuck; Messrs. Ciompi and Gustafson.



Institutional Review Board for Clinical Investigations

John M. Falletta, M.D., *Chairman*; Joseph C. Farmer, M.D., *Vice Chairman*; Barbara Echols, *Co-chairperson*; Drs. Anscher, Bentley, Brizel, Carroll, Erwin, Freedman, Gautier, Goldstein, Gwyer, Glass, Hawthorne, Herndon, Kay, Kessler, Mark, Matchar, McConnell, Myers, Ohman, Olsen, Parkerson, Patterson, Patz, Proia, Ross, Schiff, Semans, C. Smith, J. Smith, Travis, Turner, and Walmer; Ms. de Guehery, McCaskill, Nance, Perry, Sigman-Hendricks, Thomas, and Womack; Messrs. Gustafson, Rawlings, and Sparrow; Student Representatives: Mr. Bloom and Ms. Thornburg.

Library

Susan Feinglos, M.L.S., *Chairman*; Drs. Alberts, Fullagar, Gwyer, Madden, T. Mitchell, B. Turner, and Walther; Mr. Rosas; Ms. Thibodeau, *ex officio*.

Medical Center Information Systems Advisory

Landen Bain, *Chairman*; Drs. Carter, E. Hammond, and P. Smith.

Medical Radiation Control and Radioactive Drug Research Committee

Kenneth W. Lyles, M.D., *Chairman*; Drs. Briner, Harris, Lobaugh, Ludwig, Matthews, O'Foghludha, O'Hara, Plott, and Samulski; Ms. Couch and Mr. Clapp.

Medical Center Safety

Wayne R. Thomann, Ph.D., *Chairman*; Drs. Broda, Harris, Hunt, Jackson, and Kirkland; Messrs. Blalock, Borg, Chase, Guerry, Laxton, Lonon, Marsh, Moorman, Parker, Plott, Stanley, Tencer, and Trafford; Ms. Bergan, Malmberg, Kessenich, and Williams.

Medical Center Policy Advisory Committee

Ralph Snyderman, M.D., *Chairman*; Drs. R. Anderson, Blazer, Champagne, Colvin, Corless, Epstein, Frances, Frank, Halperin, Hammes, Hammond, Haynes, Kay, Keene, Means, Michener, Nevins, Pizzo, Purves, Raetz, Ravin, Reves, Sabiston, Sheetz, and Tedder; Messrs. Beyel, Donelan, and Israel; Drs. Califf and Dawson, *ex officio*.

Medical Student Research Scholarship

Galen S. Wagner, M.D., *Chairman*; Drs. Anderson, Bastia, Kaufman, N. Kredich, Lowe, Mills, Pizzo, Reedy, and Williams.

Merit Awards

Dan G. Blazer II, M.D., Ph.D., *Chairman*; Drs. Bollinger, N. Kredich, Armstrong, and Joanne Wilson; Administrative Assistant: Ms. Franklin; two student representatives.

Minority Affairs Committee for Undergraduate Medical Education

Brenda E. Armstrong, M.D., *Chairman*; Drs. Akwari, Allen, Blazer, Grady, Grant, Lewis, Sveteky, and Wigfall; Messrs. Alexander and Della Rocca; Ms. Yelverton.

Misconduct in Research

Richard S. Surwit, Ph.D., *Chairman*; Drs. Bollinger and Ward.

North Carolina Residence

Brenda Armstrong, M.D., *Chairman*; Dr. Clapp; Ms. Konczal.

Operating Room Advisory

John Robinette, *Coordinator*; Drs. Anderson, Hammond, Reves, and Sabiston; Ms. Owins; Mr. Brown.

Pharmacy and Therapeutics

Peter S. Kussin, M.D., *Chairman*; Drs. De La Paz, Gianturco, Ginsberg, Killam, Kurtzberg, Leight, Perfect, Rudd, Serra, and Wolff; Ms. Crouch, Hendrix, and Miller; Messrs. Dedrick, McAllister, Moore, and Robinette; Dr. Kessler, *ex officio*.

Primary Care Committee for Undergraduate Medical Education

Barbara Sheline, M.D., *Chairman*; Drs. Drucker, V. Johnson, Logio, and Munoz.

Research Award

Madison S. Spach, M.D., *Chairman*; Drs. Fridovich, George, Joklik, Schanberg, Semans, and Steenbergen.

Senior Scholarships

John M. Falletta, M.D., *Chairman*; Drs. Amaya-Jackson, Bastian, Kussin, Pendergast; Wright; Ms. Konczal.

Study Away

Deborah W. Kredich, M.D., *Chairman*; Drs. Blazer, Gianturco, Grady, and Puckett; Ms. B. Gentry.

Undergraduate Medical Education – Curriculum

Caroline Haynes, M.D., Ph.D. and J. Victor Nadler, Ph.D., *Co-Chairmen*; Drs. N. Anderson, Bradford, Cant, Cartmill, Corless, Dawson, Drucker, Ellinwood, Fitzpatrick, Fortney, Gianturco, Glower, Grady, Hage, Halperin, Hoffman, Hylander, G.A. Johnson, V. Johnson, K. King, D. Kredich, Kuhn, LaMantia, Lyerly, McElhaney, McIntosh, Mitchell, Morgenlander, Neelon, Nevins, Padilla, Petrusa, Puckett, Rajagopalan, K. Reimer, B. Sheline, Sladen, Steenbergen, Strauss, Vigna, Ward, Wilkinson, Wong; Student Representatives: Mr. Della Rocca; Drs. Blazer, Fullagar, Hammes, L. Lee, and Snyderman, Ms. Feinglos, Konczal, and Reilly, *ex-officio*.

Veterans Administration Research and Development

Ronnie D. Horner, Ph.D., *Chairman*; D. P. Davidson, *Program Assistant*; Drs. Annex, Bauman, Beckham, Braxton, Cohn, Hall, Hamilton, Madison, Mannon, McNamara, and Young; Drs. Newcomb, Olson, and Shelburne, *ex officio*; Mr. Freeman.

Veterans Administration, Chancellor's

Ralph Snyderman, M.D., *Chairman*; Barton Haynes, M.D., *Vice-Chairman*; Drs. R. Anderson, Blazer, Cohen, Corless, Epstein, Feussner, Frances, Grant, Halperin, Hammes, Newcomb, Pizzo, Ravin, Reves, Rotman, Scott, and Yarger; Ms. Bumgarten; Mr. Donelan.

General Information



History

I have selected Duke University as one of the principal objects of this trust because I recognize that education, when conducted along sane and practical, as opposed to dogmatic and theoretical, lines is, next to religion, the greatest civilizing influence.

I have selected hospitals as another of the principal objects of this trust because I recognize that they have become indispensable institutions, not only by way of ministering to the comfort of the sick, but in increasing the efficiency of mankind and prolonging human life.

James Buchanan Duke, Indenture of the Duke Endowment, 1924

In 1924, James Buchanan Duke, an industrialist and philanthropist, established the Duke Endowment and directed that part of his gift be used to transform Trinity College in Durham, N.C., into Duke University. The following year, upon his death, Duke made an additional bequest to the Endowment and the university, including funds to establish the School of Medicine, the School of Nursing, and Duke University Hospital.

One of the Duke's primary motivations in establishing the Endowment and the School of Medicine was the improvement of health care in the Carolinas and across the country. At a time when medicine in the Carolinas was still a cottage industry, Duke dared to dream of creating what he hoped would become one of the leading medical institutions in the nation.

By the time the new school and hospital opened in 1930, this dream was already well on its way to becoming reality. Recognizing its responsibility for providing quality care to the people of the Carolinas, Duke opened the first major outpatient clinics in the region in 1930. The Private Diagnostic Clinic, organized in 1932, not only provided coordinated medical and surgical care to private patients with moderate incomes but also allowed members of the medical faculty to contribute a portion of their earnings toward the continued excellence of medicine at Duke. Less than five years after the School of Medicine opened, the Association of American Medical Colleges ranked it among the top 25 percent of medical schools in the country.

Building on this heritage, Duke University Medical Center has grown and expanded over the years and now ranks as one of the world's outstanding health care centers. In education, its innovative medical curriculum features a generous measure of elective

courses in the belief that all health professionals must be prepared for a lifetime of self education. The scientific grounding for that education is provided through participation in a wide variety of ongoing research programs. Now located in facilities opened in 1980 and since expanded several times, Duke University Hospital draws patients from across the Carolinas, the Southeast, and much of the United States for diagnosis and treatment. In both basic and clinical research, Duke University Medical Center has grown into a premier biomedical research institution and is consistently one of the largest recipients of funding from the National Institutes of Health.

Today, in an era of rapid and substantial change in health care, Duke University Medical Center is evolving into an even broader health care institution, one that will be a model for health care in the twenty-first century. Rather than being a traditional academic medical center where patients are referred almost exclusively for specialty care, Duke is now building an integrated system of health care providers. This new Duke University Medical Center and Health System includes not only the traditional medical center, but also a regional network of Duke primary care physicians; an affiliations program with numerous community providers throughout North Carolina; a joint venture managed care company; a home health agency; an international program; and many other strategic relationships and programs.

Representing the continuing fulfillment of the dream of James Buchanan Duke, Duke University Medical Center still seeks to carry out its teaching, research, and patient care programs in a manner that meets the needs of society. In keeping with its heritage, it seeks to provide socially relevant medical education, research, and patient care and is expressly committed to the search for solutions to regional and national health care problems.

Medical Center Buildings and Facilities

The eighty-three buildings and additions which make up the medical education, research, and patient care facilities are located on approximately 210 acres on the West Campus. The southern quadrant is contiguous with the main quadrangle of the university and consists of the following: *Duke Clinic and Medical School Complex*—nine buildings, including: *Davison Building*—Department of Pathology administration, research laboratories and offices, Central Teaching Facility, Division of Audiovisual Education, Medical Center administration, School of Medicine, and Office of Admissions. *Original Hospital, 1940 and 1957 Additions*—Rehabilitation inpatient care unit, clinics, diagnostic, treatment, and support services including: clinical laboratories, physical therapy, pharmacy, departmental offices, amphitheater, and chapel. *Baker House*—Department of Obstetrics and Gynecology administration, clinics, diagnostic, treatment and support services including: speech and hearing, dentistry/oral surgery, pastoral care and counseling, and departmental offices. *Barnes Woodhall Building*—Psychiatry inpatient care units, diagnostic, treatment, and support services including: radiology, departmental research laboratories and offices, and Hospital administration. *Diagnostic and Treatment Building*—Clinics, diagnostic, treatment, and support services, departmental research laboratories and offices. *Ewald W. Busse Building*—Center for the Study of Aging and Human Development, diagnostic, treatment, and support services, departmental research laboratories and offices. *Eugene A. Stead Building*—Clinical Research Unit (Rankin), departmental research laboratories and offices. *Clinical Research II*—Department of Psychiatry administration, departmental research laboratories and offices, hyperbaric medicine unit. *Edwin A. Morris Clinical Cancer Research Building*—Clinics, diagnostic, treatment and support services, Department of Radiation Oncology administration, departmental research laboratories and offices.

The northern quadrant consists of the following: *Joseph and Kathleen Bryan Research Building for Neurobiology*—Department of Neurobiology administration, Alzheimer's Disease Research Center, Pharmacology and Neurobiology departmental research laboratories and offices. *Nanaline H. Duke Medical Sciences Building*—Departments of Biochemistry and Cell Biology administration, departmental research laboratories and

offices. *Alex H. Sands Medical Sciences Building*—Departments of Anesthesiology, Biological Anthropology and Anatomy, Cell Biology, Obstetrics and Gynecology, and Psychiatry research laboratories and offices. *Edwin L. Jones Basic Cancer Research Building*—Departments of Immunology and Microbiology administration, departmental research laboratories and offices. *Medical Sciences Research Building*—Comprehensive Cancer Center administration, Departments of Medicine, Obstetrics and Gynecology, Pathology, Pediatrics, Radiology, Radiation Oncology, Surgery, and Cancer Center research laboratories and offices. *Clinical and Research Laboratory Building*—Department of Genetics administration, Howard Hughes Medical Institute, Departments of Biochemistry, Cell Biology, Genetics, Medicine, and Psychiatry research laboratories and offices, and hospital clinical laboratories. *Bell Building*—Departments of Medicine, Obstetrics and Gynecology, Pediatrics, Psychiatry, Radiology research laboratories and offices, Medical Center Information Services, and the Gross Anatomy laboratories. *Seeley G. Mudd Communication and Library*—Medical Center Library, Office of Communications, Office of Grants and Contracts, Office of Continuing Medical Education, Medical Center Commons, and the Searle Center for Continuing Education. *Joseph A. C. Wadsworth Building (Eye Center)*—Clinic, diagnostic, treatment, and support services including: operating rooms, recovery, Department of Ophthalmology research laboratories and offices. *Duke Hospital (Anlyan Tower and Ancillary Building)*—Inpatient care units, diagnostic, treatment, and support services including: surgical suite, cath labs, emergency department, labor and delivery suite, full term nursery, radiology, laboratories, respiratory therapy, pharmacy, Departments of Anesthesiology, Medicine, Pediatrics, Radiology, and Surgery administration.

The western quadrant consists of the following buildings: *Leon Levine Science Research Center*—Departments of Molecular Cancer Biology and Pharmacology administration, research laboratories and offices. *Surgical Oncology Research Building, Environmental Safety Building, Research Park Buildings I, II, III and IV*—Departments of Anesthesiology, Medicine, Pathology, Pediatrics, Radiology, Radiation Oncology, and Surgery research laboratories and offices and hospital clinical laboratories. *Vivarium*—Division of Laboratory Animal Resources and laboratory animal care facilities. *Cancer Center Isolation Facility*—Special containment facility for cancer research. *Lenox Baker Children's Hospital*—Children's rehabilitation inpatient care unit, clinics, diagnostic, treatment and support services and departmental offices. *Dialysis Center*—Treatment facility. *Center for Living*—Three buildings including: *Sarah Stedman Nutrition Center*—Department of Medicine research laboratories and offices. *Andrew Wallace Clinic Building*—Clinics, diagnostic, treatment and support services and departmental offices. *Pepsico Fitness Center*—Exercise facilities including indoor track, exercise equipment, and swimming pool.

The eastern quadrant consists of the following buildings: *Marshall Pickens Building*—Clinic, Student Health Service, Employee Health Service, Faculty Family Health Service. *Civitan Building and Child Development Center*—Clinics, laboratories and offices for the Departments of Pediatrics and Psychiatry. *Hanes House and Nursing School Addition*—Physician Assistant Program, Biometry Program, Community and Family Medicine and Nursing School headquarters, offices, and teaching facilities.

The goal of Duke University Medical Center is to provide leadership in fulfilling its core missions which are:

To provide the most advanced and comprehensive education possible; to prepare our students and trainees for lifetimes of learning and careers as leaders, practitioners, or researchers;

To perform biomedical research producing discoveries that add to understanding life processes and lead to preventing and curing disease and maintaining health;

To translate, to practice, and to make available to the public, with compassion, the benefits of the unique clinical and technological resources of the Medical Center and to support our educational and research missions.

To the maximum extent possible, we will apply our core missions in education, research, and health care delivery to develop the means to solve regional and national health care problems, including providing accessible, cost-effective health care of measurable quality.

Resources for Study

Library. The Medical Center Library is located in the Seeley G. Mudd Building, midway between the north and south Medical Center campuses.

The Medical Center Library attempts to provide informational services and collections necessary to further educational research, and clinical activities in the health sciences. The collection of approximately 276,000 volumes and 2,700 current journal subscriptions is freely available for use by Medical Center students and personnel; study accommodations for 500 readers includes extensive provisions for audiovisual and computer-assisted learning. The library also includes the Trent Collection which is unsurpassed in the southeast as a resource for study of the history of medicine. Traditional reference services are supplemented by mediated and self-service access to many computerized databases including MEDLINE and CURRENT CONTENTS.

The Medical Library Education Center (MLEC) opened in October 1995. It includes an electronic classroom, multimedia area, and help desk.

The Medical Center Library is open: Monday-Friday, 8:00 A.M.-midnight; Saturday, 10:00 A.M.-6:00 P.M.; Sunday, 12:00 noon-midnight. Summer and holiday hours are as announced.

Director: Susan J. Feinglos, M.L.S. (McGill, 1972); Associate Director: Patricia L. Thibodeau, M.L.S., M.B.A. (Rhode Island, 1976), (Western Carolina University, 1991); Curator, Historical Collections: Suzanne Porter, M.L.S. (Columbia, 1966).

Bookstore. The Medical Center Bookstore offers a wide selection of medical reference books, textbooks, software, and instruments to the Duke University Medical Community. Clothing, including scrubs and uniforms, office supplies, and Duke gifts are also offered. Special orders are welcomed. The store is located in the Facilities Building adjacent to the PRT walkway between Duke Hospital North and Duke Hospital South and is open Monday through Friday from 8:30 a.m.-5:30 p.m., and Saturdays from 10:00 a.m.-4:00 p.m. The telephone number is 684-2717.

General Manager: Bill Ignelzi

Searle Conference Center. The Searle Conference Center for Continuing Education in the Health Sciences provides elegant accommodations for conferences, symposia, lectures, and meetings to support the continuing education activities of the Medical Center and university. Additionally, banquets, dinners, weddings, receptions, and other private events may be held on a space available basis. Meeting space, audiovisual needs, catering, and assistance with event planning are all provided by the on-site staff. Please call 684-2244.

Director: Michael A. Evans

Medical Center Commons. The Medical Center Commons Restaurant is open for fine dining at lunch time, Monday-Friday. Accepting credit cards, IRs, and reservations (684-5805) the Commons is located in the Searle Conference Center, which is on the ground floor of the Seeley Mudd Building. The restaurant features gourmet salads, homemade soups, carved meats, hot entrees, and weekly specials. Prices from \$5-\$9. Private dining rooms are available, as well as morning, evening, or weekend meeting and catering space. For additional information on these services, please call 684-2244.

Office of Medical Education Research and Development. The Office of Medical Education Research and Development offers expertise to the Medical School community in the areas of curriculum and course development, research and evaluation studies,

standardized patients, and faculty development. A few of the projects with which OMERD is involved include the following.

Clinical Performance Examination. In collaboration with the three other medical schools in North Carolina, OMERD has developed and implemented the Clinical Performance Examination (CPX). The CPX is a multi-case, standardized patient-based examination to assess skills of doctor-patient relationship, communication, history-taking, physical examination, and assessment and plan. The CPX has provided useful information for students, for the curriculum, and for accreditation. The North Carolina medical schools have collaborated with the National Board of Medical Examiners to test the feasibility of the NBME protocol of standardized patients for use in the licensure examination process.

Standardized Patients. OMERD has trained more than 250 standardized patients and has developed over 125 standardized patient cases which are used to: (a) highlight and integrate learning issues from basic, clinical, and behavioral sciences; (b) evaluate physical examination skills, and (c) assess doctor-patient relationship and interviewing skills. Duke also has used SPs in residency programs for medical interviewing courses and educational diagnostic screening, department grand rounds, and many continuing medical education courses locally and nationally.

The DOSSIER Project. Funding from the U.S. Department of Education supports a three year project to develop and test the feasibility of dossiers of educational contributions for faculty in medical education. Duke has already endorsed educational contributions as valid evidence on which to justify promotion by establishing new criteria for tenure and non-tenure positions.

MedCATs Consortium. OMERD has collaborated with the SUNY-Buffalo School of Dental Medicine to adapt their curriculum database for use in medical schools. The software, Curriculum Analysis Tools (CATs), is a database and analysis tool for documenting goals of the medical school to the objectives for single sessions. Mapping the relationships among session, course, and curriculum objectives occurs automatically. Many common curricular analyses are already programmed in CATs, such as tallying the frequency of cognitive levels addressed in all goals and objectives. The software adapted for medical and allied health is call MedCATs.

PRACTICE Course. PRACTICE (Progressive Responsibility And Competence Through Integrated Curriculum and Clinical Experience) amalgamated Clinical Arts, Human Behavior, and Introduction to Clinical Medicine along with new topics such as health care policy and financing, nutrition, medical ethics, patients' end of life issues, and women's health issues. OMERD collaborated with clinical faculty in the development of course segments, educational guidelines for small group and clinical activities, use of laptop computers, formative and summative evaluation. OMERD is also centrally involved in the administration of the course.

Cost Effective Care Clerkship. OMERD was central in the development of this innovative clerkship that provides medical students the opportunity to learn about health care policy and financing and the impact of economics on individual patients and the health care system.

Director: Emil R. Petrusa, Ph.D.

The Thomas D. Kinney Central Teaching Laboratory. The Thomas D. Kinney Central Teaching Laboratory is located on the fourth floor of Davison Building where it provides laboratory, demonstration, and conference space for all courses taught in the basic sciences with the exception of gross anatomy. A full-time staff maintains a wide range of equipment and provides supplies and services necessary for the teaching programs in allied health as well as medical education. This enables the academic staff of each department to devote its efforts entirely toward the students.

Six unit laboratories, each accommodating sixteen to eighteen students, are devoted to instruction for the first year. All first year medical students are given space (which they maintain for the entire academic year) in one of these laboratories for their own work. Small

laboratories are interspersed between the six unit laboratories and provide space for large pieces of equipment used in conjunction with exercises conducted in the unit laboratories. One large multipurpose laboratory that can accommodate forty or more students and one small room that accommodates twenty students provide space for a variety of teaching exercises. Other areas on the fourth floor of the Davison Building include demonstration and conference rooms and a microscopy lab. A computer cluster with electronic mail capability is available to students twenty-four hours a day; a thirty-workstation electronic laboratory is adjacent for computer-assisted educational training for students, faculty, and employees. Recently acquired rooms that accommodate two to ten persons are now available on Reed Ward, scheduled by the Central Teaching Lab office. There are twelve rooms suitable for physical assessment or small-group learning.

Services provided by the Central Teaching Laboratory include in-house microscope cleaning and repair, exam grading and gradebook maintenance, and course evaluation tabulation and reporting. Room scheduling includes also three large conference rooms in South Hospital for groups of 70 to 100 persons.

Manager: Carol G. Reilly, B.S.

Division of Audiovisual Education. As a Medical Center core technology support group, the Division of Audiovisual Education has a mission to provide total media support to the teaching, research, patient care, and service missions of Duke University and the Medical Center.

The Medical Art Section provides illustrations produced by various computer graphics and manual art production methods and techniques. Services rendered are surgical and anatomic drawings, schematic and mechanical drawings, diagrams, charts, graphs, designs, lettering, calligraphy, signs, and poster exhibits, as well as other forms of illustrations. An extensive computer graphics imaging service is offered for faculty and staff who create slides on desktop computer systems.

The Medical Photography Facility is staffed and equipped to provide a full range of photographic services for patient care, teaching, and research. Patient photography activity includes black and white and color photos in the studio, on the ward, in the clinic, or in the operating room. Copy photography includes a full range of slide services for internal and external lecture and presentation purposes. Black and white and color prints for publication, display, and poster session purposes are also available. Other services include daily processing of color prints and of Ektachrome slide film, location photography, and passport and application prints.

Instructional Television also supports teaching, research, and patient-care programs of the Medical Center. Betacam SP, three-fourths inch U-matic and one-half inch VHS video formats are used for color recording of staff and patient education programs, lecture presentations, and surgical procedures as part of staff professional education. Other services include fully scripted videotape productions for promotional or informational uses, instructional design, and computer-based training. Audiotape services, projectionists, and equipment rental are available.

The Curriculum Materials Development project staff works with faculty to produce media materials such as slidetape programs, videotape productions, and computer-assisted instruction programs. These materials may be a regular part of course presentations or may serve as adjuncts to classroom activities.

Director: Thomas P. Hurtgen, M.B.A.

Duke Hospital. Duke Hospital, one of the largest private hospitals in the South, is part of the Medical Center and currently is licensed for 1,124 beds. The hospital directs its efforts toward the three goals of expert patient care, professional education, and service to the community. It offers patients modern comprehensive diagnostic and treatment facilities and special acute care and intensive nursing units for seriously ill patients. More than 34,000 patients are admitted annually. Surgical facilities include forty operating rooms in which surgeons perform more than 24,000 operative procedures

annually. Approximately 2,200 babies are born each year in the delivery suite. Other special facilities for patients include a heart catheterization laboratory, hemodialysis unit, cancer research unit, medical and surgical intensive care units, hyperbaric oxygenation chamber, and cardiac care unit.

Close working relationships with private and governmental health and welfare agencies provide opportunities for continued care of patients after they leave Duke Hospital.

Ambulatory services include the outpatient clinics, private diagnostic clinics, the employee health service, and the emergency department, with annual total patient visits of more than 661,000. The clinical faculty of the Duke University School of Medicine participate in undergraduate and graduate medical education and practice medicine in the hospital and in private diagnostic clinics.

Duke Hospital, with a house staff of approximately 846, is approved for residency training by the American Medical Association and is fully accredited by the Joint Commission on Accreditation of Healthcare Organizations.

Veterans Administration Medical Center. The Durham Veterans Administration Medical Center, with 435 beds, annually admits over 7,000 patients. The hospital is within walking distance from the School of Medicine and has closely integrated teaching and training programs for medical students and house staff. These programs are provided by the full-time professional staff who are members of the faculty of Duke University School of Medicine.

Lenox Baker Children's Hospital. On November 1, 1987 the Lenox Baker Children's Hospital became a part of Duke University Medical Center, entering a new phase in its development as an orthopaedic and rehabilitation center for the children of North Carolina. A full spectrum of orthopaedic and rehabilitation services is offered to identify and meet realistic goals and to educate, support, and assist families, schools, and communities in providing a rich environment for disabled children.

Durham Regional Hospital. Durham Regional Hospital is a county-owned, 451-bed, general, short-term care community facility serving the residents of Durham County. This institution participates in many of the medical and health-related professional training experiences.

Other Hospitals. Various cooperative teaching and training programs are available for medical and allied health professional students and house staff at other hospitals including Asheville Veterans Administration Medical Center in Buncombe County, John Umstead Hospital in Butner, Fayetteville Area Health Education Center in Fayetteville, and Cabarrus Memorial Hospital in Concord, North Carolina.

Program Information



Mission Statement and the Medical Curriculum

The mission of the Duke University School of Medicine is:

To prepare students for excellence by first assuring the demonstration of defined core competencies.

To complement the core curriculum with educational opportunities and advice regarding career planning which facilitates students to diversify their careers, from the physician-scientist to the primary care physician.

To develop leaders for the twenty-first century in the research, education, and clinical practice of medicine.

To develop and support educational programs and select and size a student body such that every student participates in a quality and relevant educational experience.

Physicians are facing profound changes in the need for understanding health and disease and the delivery of medical care, changes which shape the vision of the medical school. These changes include: a broader scientific base for medical practice; a national crisis in the cost of health care; an increased number of career options for physicians yet the need for more generalists; an emphasis on career-long learning in investigative and clinical medicine; the necessity that physicians work cooperatively and effectively as leaders among other health care professionals; and the emergence of ethical issues not heretofore encountered by physicians. Medical educators must prepare physicians to respond to these changes, and the most successful medical schools will position their students to take the lead addressing national health needs. Duke University School of Medicine is prepared to meet this challenge by educating outstanding practitioners, physician scientists, and leaders.

Continuing at the forefront of medical education requires more than educating Duke students in basic science, clinical research, and clinical programs for meeting the health care needs of society. Medical education also requires addressing such concerns as national science and health policy, meeting the health care needs of society, providing medical care for the disadvantaged, and applying basic science discoveries to clinical medicine. As health care practices at the federal, state, institutional and individual levels evolve, these endeavors need input from physicians uniquely prepared to assume guiding roles.

Duke University's role as a leader in medical education is built upon our internationally-recognized tradition of fostering scientific scholarship and providing

excellent preparation for the practice of medicine. Our curriculum promotes creativity, scholarship, leadership and diversity, integrating the basic and clinical sciences and preparing students to pursue the spectrum of options available to modern physicians, from basic science to primary care. Duke University Medical School produces at least three prototype physicians; the physician scientist, the clinician-investigator; and the practitioner (either generalist or specialist).

The Duke faculty enhance the Medical School's curriculum by continually embracing new methods of education and evaluation to improve the medical education experience. Attention to curricular development assures Duke graduates that they are grounded in basic biomedical sciences, are competent and caring clinicians, are prepared to pursue a lifetime of continuing education, and are capable of participating in local, national, and international discussions about the delivery of health care now and in the future. Features of the four-year curriculum include:

- development of a core medical curriculum that is rigorous, efficient, integrative and forms a realistic base of knowledge for a physician;
- integration of basic, clinical, psychosocial, and population information and skills throughout the four years of medical education;
- a general introduction to basic and clinical science for one year each, followed by two years of individualized curricular options that promote professional diversity and personal development;
- an elective third year which permits students to pursue their independent scholarly interest across a range of scientific disciplines from basic biomedical science to health policy;
- promotion of structured active learning that will include explicit experience in leadership and cooperative roles;
- mentoring of students by faculty in all facets of the learning process;
- implementation of a standardized and valid assessment of progress, carefully and thoughtfully evaluating the acquisition of knowledge, skills, and attitudes appropriate to the future goals of each student;
- incorporation of information technology and the use of computers into student learning and evaluation;
- researching and implementation of new and improved methods of teaching.

The curriculum, while offering a previously unattainable degree of flexibility to medical education and new opportunities for intellectual exploration, also makes heavy demands upon the student. It should be recognized that medical students at the Duke University School of Medicine are expected to maintain a consistent level of performance and to demonstrate qualities of initiative and dedication to their chosen profession. A scholarly attitude toward medicine that continues throughout an entire career is an important objective of the medical school. The foundations of this attitude to learning should accompany the student upon entering.

Students are expected to maintain at all times a professional attitude toward patients, to respect confidences, and to recognize that they are the recipients of privileged information only to be discussed within the context of scholarship and in circumstances that truly contribute to the educational process or to the care of the patient. This attitude involves consideration not only of speech and personal appearance but also of morality, honor, and integrity.

Beginning in the fall of 1987, the School of Medicine greatly enlarged the focus on ethics and human values in the curriculum. In the face of major advances in medical technology and sciences, today's medical student must be prepared to deal with new complexities of medical practice. These advances and complexities also make it of paramount importance

that medical education enable each student to grow in both depth and breadth as a human being. The Duke University School of Medicine is rising to this challenge.

Doctor of Medicine Degree

The degree of Doctor of Medicine is awarded, upon approval by the faculty of Duke University, to those students who have satisfactorily completed the academic curriculum; demonstrated the intellectual, personal, and technical competencies to function as a skilled physician; and demonstrated their fitness to practice medicine by adherence to a high standard of ethical and moral behavior.

The faculty of Duke University School of Medicine have developed general guidelines for technical standards for medical school admissions and degree completion. These are available on request from the school.

The awarding of degrees is contingent upon payment of, or satisfactory arrangements to pay, all indebtedness to the university.

In February, 1995, the Duke University School of Medicine was fully accredited for seven years by the Liaison Committee on Medical Education of the Association of American Medical Colleges and the Council on Medical Education of the American Medical Association. The complete Self Study Review and LCME database is available for inspection to anyone upon request to the Registrar's Office, 125 Davison Building, telephone 919/684-2304.

Course Requirements—First Year. The student studies the principles of all the basic science disciplines. Rather than mastering an encyclopedic array of facts, the purpose is to acquire familiarity with the major principles of each subject. In addition, the School of Medicine has developed a program offered in the form of a required course entitled PRACTICE (Progressive Responsibilities and Competencies Through Interactive Curricular/Clinical Experience). This two year course is designed to expand ambulatory, primary, and continuity care experience for Duke medical students. The course is a combined clinical curricular experience which emphasizes progressive knowledge and competencies. The course meets one afternoon per week with students beginning a supervised clinic assignment in January of the first year. Thereafter, students are in the clinic every other week and in small and large group instruction in the alternating weeks.

The first year consists of instruction in the following:

Semester 1	Credit
BCH 200 - Biochemistry	4
GEN 200 - Genetics	2
CBI 200 - Cell Biology	2
CBI 201 - Microanatomy	2
CBI 202 - Medical Physiology	4
BAA 200 - Gross Human Anatomy	4
IND 201 - PRACTICE	1
Total	19

Semester 2	Credit
NBI 202 - Basic Neurobiology	4
MIC 200 - Microbiology	5
IMM 201 - Immunology	2
PHR 200 - Pharmacology	4
PTH 200 - Pathology	5
IND 201 - PRACTICE	2
Total	22

A vacation takes place after the conclusion of the first year. In addition, every class has Thanksgiving, Christmas, Martin Luther King, Jr. holiday, and spring break with the exact dates depending upon rotation and class schedules.

Course Requirements—Second Year. Satisfactory completion of the first year curriculum is a prerequisite to the second year curriculum. The second year provides an exposure to clinical science disciplines, which permits students early in their careers to become participants in the care of patients. The acquired appreciation of the problems of the clinical areas and the opportunities to recognize the applications of the basic sciences should lead to a more meaningful selection of courses for the subsequent two years.

The PRACTICE course continues in second year beginning with a three week section, Preparation for Year II. The core clinical rotations follow with eight-week rotations in internal medicine, surgery, obstetrics/gynecology, pediatrics, either an eight-week rotation in family medicine or a four-week rotation in family medicine and a four-week rotation in neurology, and a six-week rotation in psychiatry. A core clinical rotation in cost effective care lasting two weeks follows the psychiatry rotation.

The clinical performance examination (CPX) is a standardized test of clinical performance that all students must take and pass after completing second-year clerkships. It was developed by faculty from all four medical schools in North Carolina and is now administered at all schools. The purpose of the CPX is to evaluate the effectiveness of the clinical curriculum and each student's ability to respond to patient problems and concerns. Skills relating to communicating with patients and to history taking, physical examination, assessment, and follow-up plans are evaluated for fifteen different patients. Students performing below minimal competency on the CPX are required to undertake additional structured learning during their fourth year.

Course Requirements—Third and Fourth Years. Satisfactory completion of the second year curriculum is a prerequisite to the elective curriculum. The third and fourth (elective) years of undergraduate medical education build upon the experiences in basic science and clinical medicine gained in the earlier years. The elective years consist of four semesters of sixteen weeks each. In addition, the fourth year has an optional summer term also of sixteen weeks. Successful completion of sixty-four elective credits (typically thirty-two basic science credits during the third year and thirty-two clinical science credits during the fourth) is required for graduation. Course offerings are described in the different departmental sections in this bulletin. The wide selection affords an opportunity for the student, with guidance from advisers, to design a program that best satisfies her or his needs.

Third Year. The purpose of the scholarly experience, usually occurring in the third year, is to provide the student with an opportunity to focus in an area or areas of interest and to pursue, in depth, a scholarly activity. Time may also be spent gaining strength in areas of basic science weakness. Each student determines a home base study program for the basic science elective experience. With the aid of advisers, the individual elective program is devised to include an area of scholarly work to pursue which may or may not be an independent research project. Any combination of: (a) research preceptorship, (b) tutorials, or (c) courses inside or outside the home base study program may comprise the overall basic science elective experience. With rare exception, the elective experience should be taken as a block. During the eight months that comprise the third year, students are required to complete thirty-two basic science credits.

Fourth Year. The clinical elective experience, usually occurring in the fourth year, should be used to: (a) aid in decision making about the area of choice of postgraduate training, (b) obtain experiences in areas that would not be included in that postgraduate training and, above all, (c) pursue active experiences in patient care sufficient to provide the basic skills necessary for doctor-patient interaction. To satisfy requirements for the M.D. degree, students must complete thirty-two clinical science credits during the fourth year. Four of these credits must be completed in an elective requiring direct patient care.

Academic Standards. The faculty of the Duke University School of Medicine has the responsibility to define minimum acceptable standards for academic performance. In all courses, minimum passing standards are defined by the course director in collaboration with her or his department chairperson and faculty. These standards are communicated to the students at the beginning of each course. In clinical departments, acceptable professional standards of behavior and attitudes are included in performance evaluation.

Faculty have the responsibility to notify students who are not meeting minimal standards for passing a course early enough for the student to be able to work toward achieving the minimal standard by the end of the course. In most cases, this is at the midterm of a course. Tutorial help or guidance in correcting deficiencies should be offered to any student so notified.

In addition to performance directly related to course requirements, all students must maintain a high standard of professional behavior. Examples include how a student communicates with course faculty and support staff, their manifestations of responsibility to the school, fellow students, and patients, as well as behavior off-campus that would be deemed unprofessional for students-becoming-physicians. Incidents reported to the dean's office are investigated. The number of such reports, the severity of the transgression, and other aspects specific to the behavior in question may result in disciplinary action, including dismissal from medical school.

Grading. Where appropriate, certification by the individual faculty person or by the delegated representative of each departmental chairman that a student has satisfactorily completed requirements for a course shall constitute grounds for a grade of *Pass* (P) or *Pass with Honors* (H). *Pass with Honors* is reserved for those students who have performed in an exemplary manner in the opinion of the faculty. A grade of *Satisfactory* (S) or *Unsatisfactory* (U) is used to rate performance in a course for which the award of the grade of *Honors* (H) is prohibited.

An *Incomplete* (I) grade is reserved for those students who have not met all of the requirements of a course because of illness or other such extenuating circumstances, or because of the inability to attain sufficient understanding of course material without additional study. *Incompletes* that are not satisfied within one calendar year (unless an extension is granted by an advisory dean and the registrar) automatically become grades of *Fail* (F). It is the departmental chairman's responsibility or that of the delegated representative of the departmental chairman to certify that an *Incomplete* has been satisfied and to so notify the registrar. A passing grade is placed alongside an *Incomplete* on the permanent and official transcript. Grades of *I* are not removed from the permanent record. All first year courses must be satisfactorily completed before a student may enroll in second year courses. Normally, all second year courses must be satisfactorily completed before a student may enroll in the elective curriculum.

A grade of *Fail* is recorded on the permanent record of a student by the registrar upon certification by the individual faculty person or the delegated representative of the departmental chairman that unsatisfactory work has been done in the opinion of the faculty. Failures cannot be erased from the permanent record, but the requirements of the course may be satisfied by repeating the course in a satisfactory manner. At that time, a passing grade is recorded on the official and permanent transcript. A grade of *Honors* cannot be awarded to students in courses that are successfully remediated rather than retaken.

Promotion. Each student's record is reviewed periodically by promotions committees composed of course directors (or their designees) from the appropriate departments. Recommendations by these committees are made to the dean of medical education who may select one of several options:

1. promote students whose work is satisfactory;

2. warn students whose work is less than satisfactory that they must improve their scholastic endeavor and require such students to remediate, retake, or review specific courses, or to undertake other actions that may assist in the correction of deficiencies;
3. place on probation students whose work is unsatisfactory; or
4. request the resignation of any student who is considered an unpromising candidate for the degree of Doctor of Medicine.

A student wishing to appeal a decision may do so to the dean of medical education within two weeks of notification.

The dean of medical education, with the advice of the Medical Center Policy Advisory Committee, reserves the right to require the withdrawal of any student at any time if, in his opinion, the student should not continue in the School of Medicine.

Due Process Guidelines. If a student decides to appeal a decision of any promotions committee, he or she must submit in writing to the dean for medical education the reasons for the disagreement with the decision and any extenuating circumstances he or she wishes to identify within two weeks of receiving notice of the decision. Within a week of receiving the appeal, the dean for medical education appoints a Promotions Appeal Committee of three senior faculty, at least one of whom is from a basic science department. The Promotions Appeal Committee reviews the student's request, and meets with other faculty or members of the DUMC staff who have pertinent information. The student may present her or his appeal in person and may bring a friend from the faculty or student body to assist. The Promotions Appeal Committee reports its decision to the dean for medical education who presents this to the student. If the student is still dissatisfied and wishes to appeal further, he or she may request a review of the whole process by the dean of the School of Medicine, and all the documentation is provided to that office. The dean's decision, with the advice and consent of the Medical Center Policy Advisory Committee (MEDPAC), is binding.

Satisfactory Academic Progress. Satisfactory academic progress for students in the School of Medicine is construed as the successful completion of all requirements necessary for the advancement from one year to the next. These requirements are as follows:

First to Second Year. Completion of core basic science courses in one calendar year.

Second to Third Year. Completion of core clinical science courses within fourteen months.

Third to Fourth Year. Completion of thirty-two basic science credits within nine months.

Fourth Year to Graduation. Completion of thirty-two clinical science credits within one calendar year.

In unusual circumstances (including illness, remediation, or irregular sequence of courses) the determination of satisfactory progress for academic purposes is made by the dean for medical education.

For financial aid purposes, federal regulations establish the maximum time frame for completion of the program at 150 percent of the minimum time required to complete the program. Any student exceeding the 150 percent maximum time frame is ineligible for Title IV (Stafford) student financial aid funds.

Course Load. In the first year, students typically complete certain required courses whose total weight equals 20 credits in the fall and 22 credits in the spring semester. During the second year, the normal registration for each sixteen week semester is two 8-week rotations or the equivalent. In the elective years, the normal registration for any term is sixteen credits with a maximum registration of eighteen credits; no more than five credits in any four-week period may be taken. Enrollment for credit above this limit must have the written approval of the advisory dean.

Audit and No Credit Courses. With the consent of the appropriate instructor, *fourth* year students are permitted to audit one course a semester in addition to the normal program. Students who audit a course do not actively participate, submit work, or receive credit for the course. Because of the nature of an audited course, most clinical science courses cannot be audited. However, those offered in a lecture format (as indicated in the Elective Book provided to third and fourth year students) may be audited with the written permission of the instructor. After the first week of classes in any term, no course taken as an audit can be changed to a credited course and no credited course can be changed to an audit. Further, an audited course may not be repeated for credit.

Third year students may register on a "no-credit" basis only for clinical courses whose total, combined weight does not exceed four. Such courses are not considered to be "audits." Students are expected to participate fully in these courses and are graded upon the quality of their work.

Leave of Absence. A student, after presenting a written request to the dean of medical education, may be granted an official leave of absence for personal or academic reasons for two or more consecutive terms but not to exceed one calendar year. If approved, the dean provides written notification including applicable beginning and ending dates to the student, the registrar, and the director of financial aid. The student must apprise the dean in writing of her or his wish to return to the Medical School or to extend the personal leave at least sixty calendar days prior to the anticipated date of re-entry. The student desiring an extension beyond one calendar year may be required to apply for readmission to the School of Medicine. When a leave of absence is taken during the first or third year, the dean may require the student to repeat some or all of that year's academic program. To be eligible for a voluntary leave of absence, a student must have met all financial obligations to the university.

Permission to take a leave of absence for medical reasons must also be sought in writing and is usually granted for thirty days. If additional medical leave time is desired, the student's physician is requested to submit documentation concerning the need for a continuation of the leave. A medical leave extending beyond ninety days requires a statement from the student's physician attesting to her or his fitness to return to the Medical School as a full-time student.

For purposes of deferring repayment of student loans during a school approved leave of absence, federal regulations limit the leave to six months.

In all cases of leave of absence, the student is required to complete the full curriculum to be eligible to earn the M.D. degree.

Commencement. Graduation exercises are held once a year in May when degrees are conferred on, and diplomas are issued to, those who have completed requirements by the end of the spring semester. Those who complete degree requirements at the end of the fall or summer terms receive diplomas dated December 30 or September 1, respectively. There is a delay of about one month in the mailing of September and December diplomas because diplomas cannot be issued until they are approved by the Academic Council and the Board of Trustees.

Interinstitutional Program. Under an agreement with Bowman Gray Medical School, the East Carolina University School of Medicine, and the University of North Carolina-Chapel Hill School of Medicine, Duke Medical School allows students participating in the elective program to take courses at participating institutions for grades and credit toward the M.D. degree at Duke. Courses taken are usually not available at the home institution or are not offered at times that can be accommodated by the student's schedule. Students enrolled in interinstitutional courses are charged the current Duke tuition and student health fees.

Medical Licensure. "The Federation of State Medical Boards (F.S.M.B.) and the National Board of Medical Examiners (N.B.M.E.) have established a single, three-step examination for medical licensure in the United States. The United States Medical Licensing Examination (U.S.M.L.E.) provides a common evaluation system for applicants for medical licensure." (*U.S.M.L.E. 1997 Bulletin of Information*) Step 1 concentrates on basic science knowledge, Step 2 on fundamental clinical science knowledge, and Step 3 on advanced clinical science knowledge. Steps 1 and 2 can be taken in any order, but must be passed before applying to take Step 3. Of course, a full license requires also appropriate application procedures and fees for the state in which the license is issued.

Duke University School of Medicine does not use any step of this examination for evaluation of students for progress through the curriculum. Passing the examinations is the responsibility of the individual, and Steps 1 and 2 may be taken when the individual is prepared to do so. The curriculum is not directed toward preparing students for licensure examination, but successful performance in coursework should enable all students to successfully pass each step. In 1997, Step 1 is offered in June and October and Step 2 in March and August; applications are available in the Central Teaching Lab. Step 3 is offered in May and December; applications are available from the North Carolina State Board of Medical Examiners in Raleigh, N.C. Students typically take Steps 1 and 2 while in medical school. The Office of Medical Education assists students as they decide the most appropriate times during medical school to take these steps and with suggestions for preparing for the examination. Students must be registered for courses in the School of Medicine to be eligible to take the U.S.M.L.E. and should speak with affected course directors at least two weeks prior to the test dates to make arrangements for the two day absences.

Visiting Students. The School of Medicine provides opportunities for visiting students to enroll in elective courses for a maximum period of eight weeks. However, visiting students are permitted to enroll in courses only after the registration period for the applicable semester has concluded for Duke medical students. The School of Medicine does not offer long term or extensive clinical experience (sometimes called externships or clerkships) sufficient to satisfy the clinical educational requirements of foreign medical schools. Payment of a registration fee (currently \$50, subject to change) and a student health fee are required. For information write to: Coordinator, Visiting Students, Box 3005, Duke University Medical Center, Durham, North Carolina 27710.

Education Records. In accordance with the Family Education Rights and Privacy Act (F.E.R.P.A.), students are granted certain rights with respect to their education records. They are:

1. The right to inspect her or his education records
- Education records include those records which contain information directly related to a student and are maintained as official working files by the university. They do not include records made by faculty and administrators for their own use and not shown to others; campus police records; employment records; records of physicians, psychologists, etc., made or used only for treatment purposes; and records containing information relating to a person's activities after she or he graduates or withdraws from the university
- Although F.E.R.P.A. regulations do not require institutions to provide copies of the education records unless to do so would affectively prohibit an individual from viewing her or his records, it is the policy of Duke University Medical School to make such copies available. However, the Medical School may deny requests to release copies of the transcripts of those students in financial default. The Medical School also does not release copies of other schools' transcripts unless mandated by F.E.R.P.A..

2. The right to amend the contents of the education record to ensure that they are not inaccurate, misleading, or otherwise in violation of the student's privacy or other rights.
3. The right to file a complaint with the U.S. Department of Education concerning perceived failure on the part of the school to satisfy the requirements of F.E.R.P.A.

F.E.R.P.A. also limits the disclosure of personally identifiable information to others without the student's prior consent with the following exceptions:

- *Directory Information:* Certain categories of information are considered to be directory information and do not require the student's prior written consent to be disclosed. However, the Medical School registrar's office complies with a student's request to withhold directory information if notice is submitted in writing during the first three weeks of each new academic year; such requests must be renewed annually. Students considering nondisclosure should be aware that negative repercussions may result when inquiries are made by prospective employers, educational institutions, or other interested parties. This is particularly important for graduating students whose final nondisclosure requests continue to be honored until rescinded by the student.

The following have been designated as directory information by the university: name, address, telephone listing, date and place of birth, photograph, major field of study, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and most recent previous educational institution attended. In addition, class schedule is considered as directory information in the School of Medicine.

- *Legitimate Interests:* Prior consent is not required for disclosure of education records to school officials of Duke University who have been determined to have legitimate educational interests, appropriate parties in connection with an emergency, and in response to a court order or subpoena.

The complete university policy regarding F.E.R.P.A. is located in the Medical School Registrar's Office.

Combined Degree Programs

Medical Scientist Training Program. The Medical Scientist Training Program is designed for highly qualified students strongly motivated toward a career in medical sciences and academic medicine. It provides an opportunity to integrate graduate education in one of the sciences basic to medicine with the full clinical curriculum of the School of Medicine. The program requires, on the average, six to seven years of study and leads to both the M.D. and Ph.D. degrees. Although the special emphasis of this program is on basic medical science, the trainees, because of their education in clinical medicine, have a remarkable range of career opportunities open to them. Graduates of this program follow one of two broad paths. Some embark directly on careers in teaching and research in one of the basic medical sciences while maintaining strong ties with clinical science as a result of their combined training. Others enter residency programs before pursuing investigative and teaching careers in clinical medicine, carrying with them strong academic backgrounds which allow them to conduct fundamental research with a foundation of superior training and experience in basic sciences.

Eligibility. Applicants must meet the admission requirements of both the Medical School as a candidate for the M.D. degree and the Graduate School as a candidate for the Ph.D. degree. Most candidates apply for admission to the first year of the program but, in special cases, applications can be accepted from students who are in residence in the Medical School or Graduate School of Duke University. In addition to the minimum requirements for acceptance to the Medical School and the Graduate School, advanced course work in science and mathematics and prior research experience (or other evidence of research aptitude) counts heavily in the selection of candidates.

Financial Support. Students admitted to the first year of the program receive a traineeship award (National Research Service Award) consisting of a stipend and full tuition allowance from the National Institutes of Health. Currently the annual stipend is \$13,450, and financial support from that award can be furnished for up to six years assuming normal progress. These six years need not be consecutive; this permits flexibility in funding in case more than six years are required for completion of the curriculum. Funding by the NIH is limited to citizens or permanent residents of the United States.

The Training Program. This program is designed to offer trainees great latitude in the selection of course material. Basic requirements are two academic years composed of the first basic science year and the second clinical science year of the curriculum for medical students at Duke University. Following completion of the second year, the trainee enters the graduate program to complete the requirements for the Ph.D. degree. One more academic year of elective clinical study is necessary to complete the requirements for the M.D. degree. Both degrees are awarded at the completion of this sequence. Minor variations in this schedule can be arranged if this is advantageous to the student's education.

Year 1—Core Basic Science Year. This year consists of courses in anatomy, biochemistry, cell biology, genetics, immunology, microbiology, neurobiology, pathology, pharmacology, and physiology.

Year 2—Core Clinical Science Year. This year encompasses a comprehensive approach to medicine oriented to the patient as a whole. The year provides fundamental training in clinical medicine with emphasis on the relationships between general biological processes from conception through birth, development and maturation, to senescence and death, as well as individual clinical states. Special consideration is devoted to the pattern of developmental sequences and to the changes in that pattern determined by genetic composition and the particular environment in which the patient lives.

The second year consists of eight-week rotations in internal medicine, surgery, obstetrics/gynecology, and pediatrics, a six-week rotation in psychiatry coupled with a two-week rotation in cost effective care, and either an eight-week rotation in family medicine or a four-week rotation in family medicine and a four-week rotation in neurology.

Years 3, 4, 5, (6)—The Graduate Years. During the third, fourth, fifth and, if necessary, sixth year of the program, the trainee pursues graduate study to satisfy the requirements for the Ph.D. degree. These requirements include: (1) completion of necessary course work, (2) adequate performance in the preliminary examination, (3) original research suitable for a dissertation, and (4) successful defense of the thesis in the final examination. Detailed description of the other general requirements for the Ph.D. degree are stated in the *Bulletin of the Graduate School*.

The graduate curriculum of each trainee is developed in consultation with the director of graduate studies of the department in which the trainee elects to study and requires the approval of the Medical Scientist Training Program Committee. Since most of the ordering ideas and experimental techniques of all the medical sciences derive from mathematics and the physical sciences, it is essential to ensure that all students in the program have an adequate foundation in these subjects. Because of the close working relationship and geographical proximity of the departments of medical and physical sciences at Duke, the setting is unusually favorable for the achievement of that goal.

Descriptions of the graduate courses in the Departments of Biochemistry, Cell Biology, Microbiology, Immunology, Neurobiology, Pathology, Pharmacology, Biomedical Engineering, Chemistry, Zoology, the Department of Molecular Cancer Biology, and Genetics are listed in the *Bulletin of the Graduate School*. Trainees are encouraged to select courses which relate to their developing individual interests rather than follow a prescribed curriculum applied to all students in a given discipline. Such range, flexibility, and freedom are the essence of graduate education. The original research and dissertation of each trainee is supervised by a faculty adviser chosen by the trainee in consultation with the director of graduate studies in the appropriate

adviser is the chairman of the trainee's supervisory committee, which consists of at least three members from the major department. This committee generally administers the preliminary examination before the student commences original research and the final examination after the student completes the dissertation.

Final Year—An Elective Year in Clinical Science. In this year, which is entered only after completion of all requirements for the Ph.D. degree, the student and her or his Medical School advisory dean construct an individualized curriculum, which often places major emphasis on one clinical area and minor emphasis on other fields. One aim is the integration of research interests and clinical experience in such a way that the student's research competence is facilitated; therefore, this year is planned with regard to the trainee's proposed career in research as well. This elective year provides further training in clinical medicine to complement the second or core clinical year, so that the trainee's total clinical experience is the same as that given in the regular clinical years of medical school (the third and fourth years in the majority of schools). It should be noted that since students in the program receive the M.D. degree upon completion of this final year, great care is taken by the faculty to ensure that students are competent and knowledgeable in current concepts of patient care. It is hoped that the final year provides the student with an experience which is not repeated during the residency but serves to complement later phases of training. Thus, future surgeons might be exposed to fields other than surgery, since they receive intensive training in that discipline during their residency programs.

Application and Admission Procedures. The following guidelines should be observed by individuals applying to the Medical Scientist Training Program.

1. The application form for the Duke University School of Medicine should be completed and submitted as early as possible since acceptance into the Medical Scientist Training Program requires acceptance by both the Program Committee and the Medical School Admissions Committee. Applicants who cannot be accepted into the program are still fully eligible for acceptance to the Medical School if the Medical School Admissions Committee considers them qualified and desirable.
2. The application form for the Medical Scientist Training Program should be completed and submitted no later than December 1.
3. To facilitate review of this application, the Medical College Admission Test should be taken, if possible, in April of the year in which the application is submitted.
4. Only those applicants who are accepted for the program are requested to complete an application form for the Graduate School. The Graduate Record Examination is not required for this purpose.
5. Applicants are notified about acceptance into the program on or about February 15.

Additional information may be obtained by writing Salvatore V. Pizzo, M.D., Ph.D., Director, Medical Scientist Training Program, Box 3712, Duke University Medical Center, Durham, North Carolina 27710.

Primary Care Program. In September 1994, Duke University School of Medicine instituted, the Primary Care Program for medical students. The goal of the program is to develop leaders in primary care disciplines of medicine. Any student matriculating to the Medical School and expressing an interest in becoming a primary care physician can apply to join this program. The program functions much as an academic society, with periodic informal meetings of generalist faculty and program students. Students are encouraged to elect the eight-week family medicine clerkship during the second year. Though the third and fourth years remain elective years for all medical students, Primary Care Program students are encouraged to participate in either the Biometry Study Program or the Epidemiology, Health Services, and Health Policy Study Program

during the third year. These study programs provide an opportunity for dual degrees, such as M.D./M.B.A., M.D./M.H.S., M.D./M.P.P., or M.D./M.P.H. During the fourth year of clinical electives, students are encouraged to take the basic neurology clerkship, a generalist subinternship, and at least one ambulatory care rotation in a generalist discipline such as community medicine or geriatric medicine. Throughout the four years, students are assigned a primary care mentor as well as an advisory dean. Students may join the program at any time during the first three years and may withdraw from the program at any time. Participation in the program does not necessitate a primary care career choice. The program is jointly sponsored by the Departments of Community and Family Medicine, Medicine, Obstetrics/Gynecology, and Pediatrics. Additional information may be obtained by contacting Barbara Sheline, M.D., M.P.H., Box 3886, Duke University Medical Center, Durham, NC 27710, sheli002@mc.duke.edu.

The Medical Historian Program. The Medical Historian Program is conducted under the auspices of the School of Medicine and the Graduate School. Individuals earning the Ph.D. degree in history from Duke may petition the dean for medical education to receive transfer credit to be applied to the medical school degree if the major subject area is one that is related to the discipline of medicine, health policy, or public health. The combined M.D.-Ph.D. program typically extends for six years. Students complete the first two academic years in the School of Medicine (the required, core basic and clinical courses) prior to taking a leave of absence to enroll in the Graduate School. A range of appropriate courses are available there through the Department of History. Following the completion of the Ph.D. degree, the student resumes requirements for the M.D. degree.

Application and Admissions Procedures. Applicants must meet the requirements for admission to the School of Medicine and the Graduate School in the Department of History. Candidates who have completed two years of medical school are also considered. In addition to the minimum requirements established by the School of Medicine and the Graduate School, courses in history and in the history and philosophy of science count in the selection of candidates.

Applicants should complete and submit an application form to the Duke University School of Medicine and to the Graduate School for admission to the Department of History.

Further information may be obtained by contacting Peter C. English, M.D., Ph.D., Box 3675, Duke University Medical Center, Durham, North Carolina 27710, engl002@mc.duke.edu.

The Medicine and Business Administration Program. The Duke School of Medicine and the Fuqua School of Business jointly sponsor a program of combined medical and business administration education. The program provides an opportunity to acquire a full basic study of the two fields within five years. Upon satisfactory completion of the required course of study, candidates are awarded both the M.D. and the M.B.A. degrees.

Course of Study. The student in the M.D.-M.B.A. program begins the program in the School of Medicine. As in the regular M.D. program, the first year is devoted to the basic medical sciences and the second year to the basic clinical disciplines. Upon successful completion of the second year, the student takes a leave of absence from the Medical School and enters the Fuqua School of Business where the first-year curriculum is the same as that of other M.B.A. students. After the completion of two semesters, the student returns (commonly in the month of May) to the School of Medicine to begin the first half of an eight month scholarly experience through, typically, the Epidemiology, Health Services and Health Policy Study Program or in the Biometry Study Program. In the fall of that year (the beginning of the fourth year), the student continues enrollment in the School of Medicine but returns to the School of Business to complete course work. During the spring of the fourth year, the student completes the second four months of the scholarly activity period. The fifth and final year is spent in elective clinical work in the Medical School tailored to the student's specialized needs.

Eligibility. Applicants for the M.D.-M.B.A. program must qualify for admission to both the School of Medicine and the Fuqua School of Business. The usual approach is to apply to the Fuqua School of Business during the second year of Medical School. It is helpful, however, for a student to indicate upon admission to the School of Medicine that he/she has an interest in the joint degree program of the School of Medicine and the Fuqua School of Business. Neither school gives preference to joint degree candidates in the admission process.

Application Procedures. Application forms for the Fuqua School of Business may be obtained by writing to the Office of Admissions, Duke University Fuqua School of Business, Box 90104, Duke University, Durham, NC 27706. Applications for the School of Medicine should be made by utilizing the A.M.C.A.S. procedure described in this bulletin.

Financial Aid. During the four years that students are enrolled in the School of Medicine, they are eligible for financial aid from the School of Medicine. During the year students are on leave of absence from the School of Medicine and enrolled in the Fuqua School of Business, they are eligible for loans and grants through the School of Business, only.

For additional information, contact the M.D.-M.B.A. advisor Dan Blazer, M.D., Dean of Medical Education, Box 3005, Duke University School of Medicine, Durham, NC 27710, blaze001@mc.duke.edu and Richard Burton, D.B.A., Professor, Fuqua School of Business, Box 90120, Duke University, Durham, NC 27706, rmb2@mail.duke.edu.

The Medicine and Juris Doctor Program. The School of Medicine and the School of Law of Duke University jointly sponsor a highly selective program of combined medical and legal education. The program provides an opportunity to acquire a full basic study of the two fields. Upon satisfactory completion of the required course of study, candidates are awarded both the M.D. and the J.D. degrees.

Course of Study. The student in the M.D.-J.D. Program generally begins her or his course of study in the School of Medicine. As in the regular M.D. Program, the first year is devoted to the basic medical sciences and the second year to the core clinical disciplines. At this point the student enters the School of Law where the first-year curriculum is the same as that of other law students. During the next two years the student takes electives in the law curriculum, including available health law courses. In addition, some students pursue legal clerkships during the two summers to gain experience in health care law. A total of seventy-four credits must be earned in the Law School. The final time is spent in the Medical School completing elective basic science and elective clinical science work that is tailored to the student's specialized needs.

Eligibility. Applicants for the M.D.-J.D. Program must qualify for admission to both the School of Medicine and the School of Law. The usual approach is to apply for both schools simultaneously, thus reserving a place in the program prior to arrival. Applications are also accepted from members of the first and second year medical school class for admission to the School of Law and from the second year law school class for admission to the School of Medicine. Neither school gives preference to joint degree candidates in the admissions process.

Application Procedure. Application forms for the School of Law may be obtained by writing to the Office of Admissions, Duke University School of Law, Durham, North Carolina 27706. Applications for the School of Medicine shall be made by utilizing the A.M.C.A.S. procedure described in this bulletin.

Deadlines. For those seeking simultaneous admission to both schools: at the end of the junior year take the new Medical College Admissions Test (MCAT) and the Law School Aptitude Test (LSAT).

For the Medical School, complete the A.M.C.A.S. application procedures. Upon receipt of the supplemental application form from Duke, check the box indicating M.D.-J.D. Program. The deadline for the A.M.C.A.S. procedure is November 1. There is no deadline for the Law School but January 15 or earlier submission is suggested.

For additional information contact the M.D.-J.D. Advisor, David Warren, J.D., Department of Community and Family Medicine, Box 2914, Duke University Medical Center, Durham, North Carolina 27710, warre011@mc.duke.edu.

The Medicine and Public Health Program. Students enrolled in the School of Medicine, after satisfactory completion of the first two years of the regular curriculum, may request approval to seek a Master of Public Health degree at the University of North Carolina, Chapel Hill. The program is designed to train physicians in epidemiology, biostatistics, maternal and child health, health policy and administration, and in evaluating health care delivery systems. Upon receipt of the M.P.H. degree, students are awarded a full year of basic science credit toward the M.D. degree.

For additional information contact the M.D.-M.P.H. Advisor, Laurence G. Branch, Ph.D., Box 3003, Duke University Medical Center, Durham, North Carolina 27710, 919/416-5880 ext. 223, lgbranch@geri.duke.edu.

The Medicine and Public Policy Program. This four-year program is offered to meet the growing demand for persons who combine medical skills and training with a capacity for analytic public decision-making. It aims at training those persons with the requisite talent to be leaders in the development and implementation of health policy at all levels of government. Such leadership might be provided as an elected or career public official, as a leader of medical professional organizations, or as a practicing physician or medical scholar active in public affairs.

Utilizing the faculty and resources of the School of Medicine and the Terry Sanford Institute of Public Policy, the program offers students a multidisciplinary education that aims at providing:

1. A complete course of study in basic medical sciences and clinical training in the practice of medicine identical in scope and rigor with the education received by students enrolled in the Doctor of Medicine program alone;
2. familiarity with the organization and financing of health services, with particular focus on the economics and politics of health care;
3. an understanding of the political, bureaucratic, and social processes that define public problems and limit alternative approaches to their solutions;
4. a capacity for quantitative and logical methods of analysis useful in forecasting and appraising policy consequences and in evaluating existing policies;
5. an understanding of the uses and limitations of various analytic techniques and an awareness of the value considerations and ethical choices implicit in particular policy alternatives.

During the first two years at Duke, students enroll in the normal course of study in the School of Medicine. In the third year, course work shifts to the institute. In addition to the normal public policy curriculum, combined degree students are required to complete an epidemiology course. Between the third and fourth years, students have a twelve-week policy internship. During the fourth year, students complete their requirements in the School of Medicine and write a "master's memo" for the institute. When they have completed all the requirements for the two programs, both the M.D. and Master of Public Policy (M.P.P.) degrees are awarded.

Admissions. Students may apply for admission to the program when they make application to the School of Medicine or during their first or second years.

Applications. Requests for applications and specific questions about the program should be addressed to the Director of Graduate Studies, Terry Sanford Institute of Public Policy, Box 90243, Duke University, Durham, North Carolina 27708-0243, mpp@pps.duke.edu. Inquiries can also be addressed to Dan G. Blazer, M.D., Ph.D., Box 3005, Duke University Medical Center, Durham, North Carolina 27710, blaze001@mc.duke.edu.

Graduate Medical Education

Accreditation Council for Graduate Medical Education Programs. Appointments are from July 1 through June 30 with a few exceptions. Residents receive stipends, professional liability insurance, disability insurance, life insurance, health insurance, parking, on-call meals, psychological counseling, uniforms, and laundry of uniforms.

Programs offered with the program training director of each service are as follows:

A and I Diagnostic Lab Immunology
Allergy and Immunology
Anesthesiology: Critical Care
Anesthesiology: Pain Management
Anesthesiology
Cardiovascular Disease
Child Neurology
Child Psychiatry
Clinical Cardiac Electrophysiology
Critical Care Medicine
Critical Care Pediatrics
Dermatology
Dermatopathology
Endocrinology/Metabolism
Family Practice
Gastroenterology
General Pediatrics
Hematology/Oncology
Infectious Diseases
Internal Medicine: Geriatric Medicine
Internal Medicine
Internal Medicine: Neurology
Medical Microbiology
Medicine: General
Medicine/Pediatrics
Medicine/Psychiatry
Neonatal/Perinatal Medicine
Nephrology
Neurological Surgery
Neurology
Neuropathology
Nuclear Medicine
Obstetrics-Gynecology
Ophthalmology
Orthopaedic Hand Surgery
Orthopaedic Sports Medicine
Orthopaedic Surgery
Otolaryngology
Pathology: Cytopathology
Pathology: Hematology
Pathology
Pediatric Cardiology
Pediatric Endocrinology
Pediatric Hematology-Oncology
Pediatric Nephrology
Pediatric-Infectious Disease
Pediatric Rheumatology
Pediatric Pulmonology
Pediatric Radiology
Pediatrics
Plastic Surgery
Preventative Medicine: Occupational
Psychiatry
Psychiatry: Geriatric

Dr. Rebecca Buckley
Dr. Rebecca Buckley
Dr. Robert Sladen
Dr. Bruno J. Urban
Dr. Catherine Lineberger
Dr. Gary Stiles
Dr. Darrel Lewis
Dr. Charles Keith
Dr. J. Marcus Wharton
Dr. William Fulkerson
Dr. Jon Meliones
Dr. Sheldon Pinnell
Dr. Christopher Shea
Dr. Marc Drezner
Dr. Kathryn Andolsek
Dr. Rodger Liddle
Dr. Dennis Clements
Dr. Russell Kaufman
Dr. John Hamilton
Dr. Harvey Cohen
Dr. Ralph Corey
Drs. Ralph Corey/Joel Morganlander
Dr. Barth Reller
Dr. Harvey Cohen (acting)
Drs. Ralph Corey/Deborah Kredich
Drs. Ralph Corey/Tana Grady
Dr. Ronald Goldberg
Dr. William Yarger
Dr. Allan Friedman
Dr. Allen Roses
Dr. Roger McLendon
Dr. Edward Coleman
Dr. Charles Hammond
Dr. Stephen Pollock
Dr. James Urbaniak
Dr. Kevin Speer
Dr. James Urbaniak
Dr. William Richtsmeier
Dr. Leslie Dodd
Dr. S. Thomas Traweek
Dr. William Bradford
Dr. Stephen Sanders
Dr. Michael Freemark
Dr. Philip Rosoff
Dr. John Foreman
Dr. Ross McKinney (acting)
Dr. Deborah Kredich
Dr. Thomas Murphy
Dr. George Bissett
Dr. Deborah Kredich
Dr. Scott Levin
Dr. Woodhall Stopford
Dr. Tana Grady
Dr. John Breitner

Pulmonary Diseases
Radiology: Neuroradiology
Radiation Oncology
Radiology: Diagnostic
Radiology: Diagnostic (Nuclear)
Rheumatology and Genetics
General Surgery
Surgery: Critical Care
Thoracic Surgery
Urology

Dr. James Crapo
Dr. Robert Tien
Dr. Ed Halperin
Dr. Linda Gray
Dr. Edward Coleman
Dr. David Pisetsky
Dr. Theodore Pappas
Dr. Lawrence Reed II
Dr. Walter Wolfe
Dr. David Paulson

Duke University Medical Center is a participating member of the National Resident Matching Program, 2450 N Street N.W., Suite 201, Washington, DC 20037-1141. All applicants for first-year postmedical school appointments must register with this program.

Both men and women graduates of any L.C.M.E.-accredited medical school are eligible for appointment and all applicants are considered without regard to race, color, religion, national origin, handicap, veteran status, sexual orientation or preference, sex or age (except where sex and age are a bona fide occupational qualification).

Requests for application forms and information about residencies should be addressed to the program training director of the service under which training is desired. A transcript of the medical school record is required, and must either accompany the application or be furnished by the dean of the medical school.

Graduates of medical schools outside the United States and Canada must hold a valid standard or interim certificate from the Educational Commission for Foreign Medical Graduates (E.C.F.M.G.), 3624 Market Street, Philadelphia, Pennsylvania 19104, to be considered for appointment to residencies. Physicians who are not U.S. citizens or permanent residents and who need sponsorship as J-1 exchange visitors must have passed required exams to be eligible for a visa. The required exams are: the United States Medical Licensing Exam (U.S.M.L.E.), Steps 1 and 2; the National Board of Medical Examiners Exam (N.B.M.E.E.), Parts I and II; the Foreign Medical Graduate Examination in the Medical Sciences (F.M.G.E.M.S.); the Visa Qualifying Examination (V.Q.E.); or a combination of these which is acceptable to E.C.F.M.G. plus an English language exam acceptable to E.C.F.M.G. Visas other than the J-1 may be available to physicians who have passed additional exams and hold additional qualifications. Applications should be sent directly to a department or division. An application which does not include a copy of a valid E.C.F.M.G. certificate and evidence of passage of the required exams is considered incomplete and may be discarded without further notice to the applicant. For further information contact Catheryn Cotten, International Office, Box 3882, Duke University Medical Center, Durham, North Carolina 27710, cotte002@mc.duke.edu.

Reasonable requests for reduced scheduling are considered. Inquiries should be directed to the program training directors of approved residencies.

The Durham Veterans Administration Medical Center adjoins the Duke University Campus and is affiliated with Duke University Medical Center. The full-time professional staff of the V.A. Medical Center are all faculty members of the School of Medicine. All training programs are integrated with corresponding programs at the Duke University Medical Center, including rotation of house officers at each hospital.

All trainees are required to be licensed by the State of North Carolina. This may be accomplished by: (1) a residency training license that covers only training by Duke and is not convertible to a full North Carolina license, or (2) a full North Carolina license that is a complete medical license. A complete medical license is obtained either by state boards (North Carolina Boards can only be taken upon completion of internship) F.L.E.X., U.S.M.L.E. Step III, or National Boards. North Carolina is not reciprocal with other states for full licenses. Duke University Medical Center cannot make applications for house staff. Since house staff members must have the license before beginning duties, arrangements for the license should be made in advance. All incoming house staff must

contact the House Staff Office, Box 3951, DUMC, Durham, North Carolina 27710 for current licensure requirements.

Application forms and information for residencies or fellowships may be obtained by writing the program training director of the appropriate department, Duke University Medical Center, Durham, North Carolina 27710.

Auditing of Courses by House Staff. Residents and fellows at the Medical Center may audit courses through the undergraduate and graduate divisions of Duke University by obtaining the written permission of the course instructor and the dean for continuing education and by paying the current audit fees. House staff members are not permitted to take courses offered through the division of undergraduate medical education. For more information, please contact Dr. Paula Gilbert, Academic Dean for Continuing Education, The Bishop's House, Duke University, Durham, North Carolina 27708, (919) 684-6259.

Postgraduate Education

Continuing Medical Education.

Mission. The goal of the Office of Continuing Medical Education (C.M.E.) is to promote life long learning by physicians and other health care professionals so they may deliver cost-effective quality care provided with compassion, knowledge and sense of on-going inquiry. The scope of C.M.E. is intended to provide, enhance, and maintain knowledge, attitudes, and skills of physicians from all disciplines with medical and health information which is appropriate to the changing health care environment. To achieve the C.M.E. goal, conventional activities are used as well as new technologies and innovative activities in a combined opportunity for interchange and reinforcement.

Numerous formal postgraduate courses are given throughout the year for physicians in general practice as well as in all specialties. Conferences and tutorial seminars are also available to any physician who desires to attend and participate. Physicians in practice may make arrangements for a period of one day or more for courses tailored to their particular interests. These personal contacts with senior faculty and residents, including patient examinations as well as follow-up care help provide in-house training experience.

For additional information, please contact the Office of Continuing Medical Education, Duke University Medical Center, Box 3108, Durham, North Carolina 27710, (919) 684-6878 or toll free 1-800-222-9984, east001@mc.duke.edu.

Student Life



The University

Duke University, located in Durham, North Carolina, has an enrollment of 11,611 students from all fifty states and from many foreign countries. Currently, Trinity College of Arts and Sciences, the Graduate School, and the Schools of Business Administration, Divinity, Engineering, Environment, Law, Medicine, and Nursing comprise the university.

Durham, with a population of 148,000, is in the Piedmont region of North Carolina and has easy access to the sea coast and mountains. It is one of the three cities bounding the Research Triangle Park where numerous private research laboratories and governmental agencies are located. Duke University is twenty-five miles from North Carolina State University in Raleigh, eight miles from the University of North Carolina at Chapel Hill, and is in the same city as North Carolina Central University.

Conduct of Students

Duke University expects and requires of all its students cooperation in developing and maintaining high standards of scholarship and conduct.

All students are subject to the rules and regulations of the university which are currently in effect or which, from time to time, are put into effect by the appropriate authorities of the university.

Any student, in accepting admission, indicates the willingness to subscribe to and be governed by these rules and regulations and acknowledges the right of the university to take such disciplinary action, including suspension and/or expulsion, as may be deemed appropriate for failure to abide by such rules and regulations or for conduct adjudged unsatisfactory or detrimental to the university.

Living Accommodations

Duke University has two residential apartment facilities in which graduate and professional students live. These apartments are available for continuous occupancy throughout the calendar year. All the apartments are completely furnished by the university. An itemization of furnishings is included with the floor plans sent out in the application packet.

Spaces in apartments for single students are provided on an individual basis with each student paying rent per academic term to the university. This method permits students to share apartments with others of their choice. When this is impractical, the Department of Housing Management strives to place persons with similar interests together.

Town House Apartments. Town House Apartments, located about three blocks from the main East-West Campus bus line, is a thirty-two-unit complex. These apartments are more spacious than most apartments found on campus or in Durham. Because of its location away from the academic facilities, students find that these apartments offer a change from normal campus life and activities.

Each air-conditioned apartment includes a living room, a master bedroom, a smaller bedroom, a bath and a half, and an all-electric kitchen with a dining area. Spacious closets and storage spaces are provided within each apartment. A swimming pool, located in the center of the complex, is open during the late spring and throughout the summer months.

All utilities—water, heat, air-conditioning, and electricity—are provided. Telephone jacks are provided in each apartment. Duke University's Tel-Com supplies telephone service. Residents are responsible for providing their own phones and having them connected.

Central Campus Apartments. Duke University also operates a 500-unit apartment complex.

A swimming pool, located in the center of the complex, is open during the late spring and throughout the summer months. Additional facilities include a pub, convenience store, tennis courts, and basketball courts.

All utilities—water, heat, air-conditioning, and electricity—are provided. Telephone jacks are provided in each apartment. Duke University's Tel-Com supplies telephone service. Residents are responsible for providing their own phones and having them connected.

Efficiency, two-bedroom, and three-bedroom apartments are rented to graduate students. Efficiency units are very limited in number and are not generally available to new students.

Application Procedures. When students are informed of their acceptance to the Medical School they also receive a postcard on which to indicate preference for university housing. This postcard should be returned to the Department of Housing Management. Detailed information on the types of accommodations and application forms is forwarded to the accepted student. Assignment to all university housing is made on a first-applied, first-assigned basis and is not guaranteed.

Off-campus Housing. The Department of Housing Management maintains a listing of rental apartments, rooms, and houses provided by property owners or real estate agencies in Durham. These listings are available in the department only; during the summer an assistant is available to answer questions and to aid students in their attempts to obtain housing off campus. Information on commercial complexes in the Durham area may be obtained by indicating a preference for off-campus housing on the postcard which students receive with their acceptance notices. Except for assuring that owners sign a statement of nondiscrimination, off-campus property is in no way verified and neither the university nor its agents negotiate between owners and interested parties.

The search for accommodations should begin as soon as possible after acceptance to the Medical School. A visit of two or three days allows students the opportunity to make use of the off-campus service and to inspect personally the availabilities.

Dining Facilities. In addition to the Medical Center cafeteria, a number of dining facilities are located within a short distance from the Medical Center. Duke Dining Services operates a variety of dining facilities including coffee bars, traditional cafeteria-style facilities, full-service restaurants, and fast food facilities. The many dining locations on campus give Duke students virtually unlimited dining options. For more information about campus dining options, contact Dining Services at 029 West Union Building, Box 90898, Durham, NC 27708-0898, 919/660-3900, dining@mail01.adm.duke.edu.

Services Available

Student Personal and Professional Advisory Program. One important objective of Duke University School of Medicine is to promote an informal, cordial student-faculty relationship. It is also felt that this type of relationship fosters better curriculum and career advising for the student. Each entering student is assigned to one of four advisory deans who oversees her or his academic progress and with whom the student meets in small groups and individually for personal advising, curriculum planning, and career counseling. A full-time associate dean is available to students on a strictly confidential basis for personal and crisis counseling or referral.

Student Health Service. The Student Health Service is administered by the Department of Community and Family Medicine, Duke University Medical Center. Medical services are provided by board-certified faculty and by physician assistants, nurse practitioners, and resident physicians under faculty supervision.

Duke Family Medicine Center. The DFMC (684-3180), located on the corner of Erwin Road and Trent Drive in the Marshall Pickens Building, is the primary location for medical care. Students are seen by appointment Monday-Friday, 8:00 a.m.- 5:30 p.m., Saturdays from 12:00 p.m.-3:00 p.m., and Sundays from 1:00 p.m.- 4:00 p.m. A wide variety of services are available: general medical care, health education, laboratory, pharmacy, travel and immunization, x-rays, cold/flu self-help table, allergy clinic, and nutrition counseling.

Students are encouraged to use the Duke Family Medicine Center as their portal of entry to other health resources when needed, including the specialty clinics at Duke University Medical Center. This helps with coordination of appropriate care.

For problems arising after hours, students should call the Infirmary (684-3367). The nurse may advise the student to come to the Infirmary or to the Duke Emergency Department (684-2413) for further evaluation. In the event of an obvious life-threatening emergency, students should go directly to the Emergency Department. If necessary, Duke Public Safety (call 911 or 684-2444) provides on-campus transportation to the Emergency Department or the Infirmary.

The Infirmary. The Infirmary (684-3367), located on the fourth floor of Duke University Hospital South Division, purple zone, provides inpatient treatment of illnesses too severe to manage in the residence hall or apartment, but not requiring hospitalization.

Health Education. This component of the Student Health Service is headquartered at Hanes Hall and at the Healthy Devil Health Education Center in House 0 on West Campus. Health education staff are available to assist students in making informed decisions that promote their health. Topics of concern include alcohol and other drug usage, eating and nutrition, sexual activity and sexually transmitted diseases, stress management, and others.

Student Health Physical Therapy. The Student Health Physical Therapy Clinic is located on West Campus in the basement of Card Gym. A physical therapist is available from 2:00-5:00 p.m. weekdays, on a walk-in basis, to assess exercise-related problems and to outline short-term treatment plans, aid recovery, and help prevent re-injury.

Confidentiality. Information regarding the physical or mental health of students is confidential and is released only with the student's permission.

Student Accident and Hospitalization Insurance. Health insurance is essential to protect against the high cost of unexpected illnesses or injuries which would require hospitalization, surgery, or the services of specialists outside the Student Health Service.

Therefore, all students are required to have such insurance. At the beginning of each fall semester, medical students must provide proof to the bursar's office of coverage under an accident and hospitalization insurance policy or purchase the Duke Student Accident and Hospitalization Insurance policy. This insurance policy provides protection twenty-four hours per day during the twelve-month term of the policy of each student insured and is specifically designed to complement the coverage provided by the student health fee (see below). Students are covered on and off the campus, at home, while traveling between home and school, and during interim vacation periods. Coverage for the student's spouse and dependent children also may be purchased. Further information about this plan can be obtained from Hill, Chesson, and Associates (489-7426).

Health Fee. All currently enrolled full-time students and part-time degree candidates are assessed a mandatory student health fee. This covers most services rendered within the Student Health Service during each enrolled semester. An optional summer health fee for students not enrolled in summer sessions is also available through the bursar's office.

Services Covered by the Health Fee. The health fee covers most of the services at Duke Family Medicine Center if medically indicated and rendered by a student health provider:

- medical care for acute and chronic illness, and minor injuries
- one health maintenance examination every two years and most associated studies
- most routine laboratory and x-ray services
- allergy shots
- confidential pregnancy testing
- most medications required for short-term treatment of acute problems
- immunizations required for programs receiving academic credit at Duke (note: a supplemental fee may be required for certain immunizations), excluding prematriculation immunizations

The health fee covers a variety of other services at DFMC and other locations:

- health education and health promotion including nutrition consultation
- infirmary service, not including meals and not including diagnostic testing ordered by specialist consultants
- mental health and career counseling at CAPS

Services not Covered by the Health Fee. If you are unsure whether a service is covered, *please ask the staff of the Duke Family Medicine Clinic business office prior to receiving the service.* You are financially responsible for the following:

- medical care provided in the Emergency Department, hospital, or other non-student health facility
- care provided by specialist consultants, including those working within the student health facilities
- dental care
- pregnancy care or deliveries
- tests, procedures, prescriptions not medically indicated, not on the approved list, or not ordered by student health providers
- immunizations required for entrance to Duke or other universities or for personal travel
- medications not on the student formulary and those required for long-term use; contraceptives

Upon arrival on campus, all students receive a description of the program and the services covered by the student health fee.

Student Health Service, William A. Christmas, M.D., *Director*, 353 Hanes Hall

Counseling and Psychological Services. Counseling and Psychological Services (CAPS) is located in Suite 214, Page Building on West Campus. CAPS, a component of

student services, provides a comprehensive range of counseling and developmental services to assist and support Duke students so that they may best profit from their academic opportunities.

The professional staff is composed of psychologists, clinical social workers, and psychiatrists experienced in working with young adults. They provide direct services to students including evaluation and brief counseling/psychotherapy regarding a wide range of concerns. These include issues of self-esteem and identity, family relationships, academic performance, dating, intimacy, and sexual concerns. Ordinarily students are seen for counseling by appointment. If the concern requires immediate attention, a CAPS staff member assists with the emergency at the earliest possible time.

Each year CAPS offers a series of counseling, therapy, and support groups. These explore such interests as stress, relationships, awareness of diversity, and management of eating disorders. Support groups have been offered to graduate and professional school women, and gay and lesbian students. A group on interpersonal dynamics is open only to graduate and professional school students. Interested students may contact CAPS for further information.

Another function of CAPS is to provide consultation regarding student development and mental health issues affecting not only individual students but the campus community as a whole. The staff works with other campus personnel including administrators, faculty, the student health staff, and student groups in meeting needs identified through such liaisons. Contact CAPS at 660-1000.

Student and Professional Organizations

Alpha Omega Alpha Medical Honor Society. Alpha Omega Alpha, founded in 1902, is the national medical honor society. The society works to promote scholarship and research in medical schools as well as high standards of character and comportment toward patients among students and physicians. The Duke chapter of AOA was founded in 1931 and has since played an important role in the medical center. For the past twenty-six years, AOA has sponsored an original studies symposium where third year medical students present their research findings. The symposium consistently attracts speakers of national prominence to deliver the keynote address. Election into the honor society is restricted to one-sixth of the graduating class. Members are elected in both the third and fourth years of medical school. The primary criteria for election in the third year is superior academic performance as demonstrated by excellent grades in the first two years of medical school. Election in the fourth year is still primarily based on outstanding academic achievement in courses, but additional factors such as comportment towards patients and colleagues, community service, significant research activities, and other similar accomplishments are accorded greater weight. AOA membership is also conferred upon physicians, including alumni and faculty members who have distinguished themselves in research, teaching, and practice.

Duke University Chapter Councillor: Harvey J. Cohen, M.D.

President: B. Jay Rao

Davison Society. All medical students are dues-paying members of the Davison Society, named for the first dean of Duke Medical School. The society is governed by the Davison Council which consists of elected officers (president, service vice-president, social vice-president, secretary, treasurer, and intramural sports chairman) and elected representatives from each class. Primary responsibilities of the council include: chartering of medical student groups, budgeting funds for student groups and medical school activities, organization of medical school activities and social events, appointment of medical students to Medical Center and university committees, and representing student views to the pertinent faculty and administration. The Davison Council also coordinates medical student projects with community service groups such as Adopt-A-Highway, Habitat for Humanity, Share Your Christmas, Durham City

Schools Seventh Grade Sex Education Program, AIDS Volunteer Network, Durham Community Kitchen, and the North Carolina Museum of Life and Science Saturday Science Program.

Medical student groups affiliated with, and in the past funded by, the Davison Society include: the American Medical Student Association, the North Carolina Student Rural Health Coalition, the North Carolina Medical Society Student Chapter, the Student National Medical Association, *Shifting Dullness* (the medical student newspaper), the Christian Medical and Dental Society, and the Asian-American Medical Student Association.

Also: Children's Miracle Network Auction, Student Curriculum Committee, Duke Comprehensive Cancer Center Volunteer Program, Family Medicine Interest Group, Pediatric Cardiology Volunteer Program, Self Defense Workshop, the *Aesculapian* (yearbook), and Women in Medicine.

Meetings of the council occur every two weeks. Minutes of council meetings and information pertinent to the student body are posted on the medical students' Internet site, <http://www.duke.edu/web/medstudent>. The members of the council are elected in the spring of each year except for the first year class representatives who are elected during the first fall after matriculation. An annual formal, the Davison Ball, is held in the spring.

President: Allston J. Stubbs

Vice-Presidents: Michael P. Bolognesi and Joanne J. Lager

Secretary: Jane P. Gagliardi

Treasurer: Trip J. Meine

The Engel Society. The Engel Society, established in 1966 as a memorial to Professor Frank L. Engel, is designed to promote intellectual and social interaction between students and faculty. Membership is limited to six junior students and six senior students who have demonstrated an inquisitive nature, humanitarian interests, and high scholastic ability. Four faculty members are selected annually by members of the society for three year terms. Four to six programs are held each year, and all students may be invited to participate in lecture programs sponsored by the Society.

Engel Society Moderator: Delbert L. Wigfall, M.D., Box 3959, Duke University Medical Center, Durham, North Carolina 27710.

Duke Medical Alumni Association. The Duke Medical Alumni Association seeks to support and promote the interests of Duke University Medical Center and its extended community by creating and strengthening life-long relationships between classmates, colleagues, faculty, and future physicians. The association is comprised of more than 4,500 Duke School of Medicine graduates and 4,600 former house staff members representing every state in the nation as well as forty-nine countries world wide. Each year the association sponsors events and activities including Medical Alumni Weekend, Medical Parents Weekend, Business of Medicine programs for current residents, the Alumni Host Program, regional events, a student-house staff-faculty tennis tournament, a student orientation picnic and other activities (including the Candy Jar), and distribution of the publications *Perspectives* and *Medical Alumni News*.

President: David K. Wellman, M.D. 1972, H.S. 1972-78, Durham, North Carolina;

President-Elect: John F. Lucas, III, M.D. 1981, H.S. 1981-88, Greenwood, Mississippi;

Ellen R. Luken, Executive Director, Medical Alumni Affairs.

Awards and Prizes

Allen Travel Award. Dr. Susan Allen (Duke alumna) has provided funds to assist a third or fourth year student in traveling to Africa for research/study of health care. Selection of an appropriate student is made by the dean; the amount of the award may be up to \$1,500.

Davison Scholarship. The Davison Scholarship award, consisting of \$2,000, is supported by the Davison Club in the memory of Dean Davison to enable a medical student

to participate in a clinical science elective outside the United States in an area of primary care. Any student eligible to study away may apply for the award. For consideration for the scholarship, the elective must be approved by the Study Away Committee.

Thomas Jefferson Award. This award, consisting of \$100, a certificate, and a book recognizes a graduating senior student who has made outstanding contributions to the university or to fields which have not been traditionally confined to science and medicine. The award is given by the Awards Committee to a graduating senior.

The Joseph Eldridge Markee Memorial Award in Anatomy. This award, donated by the friends and family of the late Dr. J. E. Markee, James B. Duke Professor of Anatomy and chairman of the Department of Anatomy from 1943 to 1966, consists of a certificate, medallion, and cash award of \$200. It is presented by the Department of Anatomy to the most outstanding student in anatomy during the first year in the Medical School.

C. V. Mosby Book Award. Three graduating senior students are selected by the Awards Committee for active participation in service to the students, community, and medical school. The award is a Mosby book of the student's selection.

E. Eugene Owen, M.D. Clinical Awards. Four graduating seniors are selected for a cash award based on excellence in the clinical sciences in the second and fourth years. The Owen Award honors Dr. E. Eugene Owen, a distinguished diagnostician of the Watson Clinic in Lakeland, Florida. The Watson Clinic Foundation makes these annual awards.

Trent Prize. An annual award of \$100 is given to a Duke medical student for the best essay on any topic in the history of medicine and allied sciences. Mary Trent Semans established this award in memory of the late Josiah C. Trent to encourage students to undertake independent work in the history of medicine and to utilize the resources of the Trent Collection.

Upjohn Award. The award consists of \$200 cash and a certificate and is presented to a Duke graduating senior for excellence in community health science projects and service to the community.

Sandoz Award. This award is given to a senior student who has done distinguished work in basic science research or clinical research. Students are nominated for this award by departmental chairmen with whom their work has been done. The work must have been presented at the AOA symposium and voted upon by the Awards Committee. It consists of a plaque and a check for \$100 and is limited to one student.

Ciba Award. This award is given to a third year student who has contributed to the health care of the community. Students are nominated by the student body and voted upon by them. The award consists of the complete set of medical illustrations and text by Frank Netter.

Other Awards. Throughout the year, Duke Medical School receives notification of awards consisting of books, money, and/or plaques or medals to be awarded to students in a variety of fields at all medical schools on a national competitive basis selected by committees of the sponsoring organizations. These awards are screened by the dean's office and publicized appropriately.

Admissions



Admission Procedures

Good study habits, intelligence, character, and integrity are essential qualifications for admission. Beyond this, premedical students should strive for an education that develops abilities to observe critically, think analytically, and work independently. Though a knowledge of basic scientific principles should be secured, the competence with which premedical students conduct their undergraduate careers is of more importance than the specific subjects which they study.

Application for Admission. The Duke University School of Medicine participates in the American Medical College Application Service (A.M.C.A.S.). Application materials may be obtained from a premedical adviser or by writing: American Medical College Application Service, Association of American Medical Colleges, Suite 201, 2450 N Street, N.W., Washington, D.C. 20037-1131.

Upon receipt of the application materials from A.M.C.A.S., if credentials indicate, a supplemental application and other information are mailed which serve as notification of receipt of the application from A.M.C.A.S. Applications are received by A.M.C.A.S. any time after June 15 until October 15, which is the deadline for all material to be received by A.M.C.A.S. Applicants are urged to file their applications as early as possible. Supplemental applications should be returned within two weeks of receipt by the applicants. The absolute deadline for the supplemental application is December 1. Upon receipt of the supplemental application, two faculty members determine whether or not to proceed with an interview.

Requirements. Admission to the School of Medicine requires a minimum of ninety hours of approved college credit including one year of college English or a university writing course, one year of inorganic chemistry, one year of organic chemistry, one year of physics, one year of biology and/or zoology, and one year of calculus. An introductory course in biochemistry during the senior year is helpful. All science requirements must be completed not more than seven years prior to entrance. The Medical College Admission Test, administered by the American College Testing Programs and Services, P.O. Box 414, Iowa City, Iowa 52240, is required of all applicants. This test is given in April and September of each year at numerous colleges throughout the United States. If possible, students should arrange to take this test in April of the year they plan to submit applications for admission. M.C.A.T. scores dated earlier than four years prior to the year applied for are not considered.



Selection

The earliest date of notification of acceptance is in February for students entering the following August. Data on each candidate are screened using a computer model of matriculated students. Those selected to receive a supplemental application are carefully evaluated by the Committee on Admissions. A personal interview is conducted at Duke for those students with satisfactory credentials. Candidates may have personal interviews with regional representatives of the Admissions Committee. Those candidates who demonstrate the most promise for exceptional performance in their future practice of medicine are admitted on the basis of merit. In order to ensure enrollment, accepted candidates must return a signed agreement within three weeks after notification. Since admission is offered in advance of matriculation, it is provisional upon the successful completion of any incomplete premedical required subjects as well as the continued demonstration of scholarship in college course work.

Transfer

Duke University School of Medicine does not accept transfer students except in unusual circumstances.

Advanced Placement

After acceptance to the School of Medicine, students who hold Ph.D. degrees in biomedical or preclinical sciences may apply to be considered for a three-year, M.D. degree program. This program consists of the core basic science courses during the first year, the core clinical rotations during the second year, and clinical electives during the third year. Students whose Ph.D.'s have not been awarded prior to expected matriculation are not eligible for this program. Students must complete all Ph.D. requirements prior to matriculation if application is made while still in graduate school.

Reapplication

Students who wish to apply for a second time should write A.M.C.A.S. requesting new application forms. Supporting documents are transferred to the new application file. These documents are kept on file for three years. To be seriously considered, reapplicants must make significant additions of experience or coursework to the original application.

Immunization and Health Record

North Carolina State law and the Infection Control Committee at the Medical Center require all new students to provide, within thirty days of matriculation, evidence of immunity to certain vaccine-preventable illnesses. Upon acceptance, students receive the Student Health Immunization Form and Report of Medical History which should be completed and returned to the Director of Student Health Services, Box 2899 DUMC, Duke University, Durham, North Carolina 27710. Students without all the required immunizations can be referred to health facilities in Durham. Some inoculations are available through Student Health Services, also.

Summary

Three years of college work, a fifty-five dollar (\$55) nonrefundable application fee, a signed agreement within three weeks of notification of acceptance, and the Medical College Admission Test are required. The estimated, first year class size for 1997-98 is 100.

Roster of Regional Representatives of Admissions Committee

Alabama:	<i>Birmingham, Margaret M. Tarpey</i>
Arizona:	<i>Tucson, Ruth H. Capp, David S. Shimm</i>
Arkansas:	<i>Little Rock, E. Clinton Texter, Jr., Larry W. Williams</i>
California:	<i>Artesia, Garrett F. Saikley; Burlingame, J. M. Javer, Andrew Nadell; Carmichael, John R. Dein; Fairfield, William R. Nesbitt; Fontana, Henry L. Burks; Irvine, A. Brian Davis; La Jolla, Herman F. Froeb; Los Angeles, Walter Lusk, Douglas F. Smiley; Redlands, Perry Dyke; Redwood City, John B. Simpson; Sacramento, Sidney M. Gospe, Jr.; San Diego, Stuart B. Kincaid, Robin E. Rutherford, Donald J. Williams; San Francisco, Robert Kahn, R. Gray Patton, Henry Safrit; Santa Monica, Kenneth P. Ramming; Walnut Creek, David S. Forth</i>
Colorado:	<i>Denver, Frederick L. Grover, Michael J. Jobin, York E. Miller; Englewood, Bertram Goldberg</i>
Connecticut:	<i>New Haven, G. P. Beardsley, David J. Goodkind, Stephen J. Huot</i>
District of Columbia:	<i>Jonca C. Bull, Kurt D. Newman</i>
Florida:	<i>Gainesville, Jerry Berger, Timothy R. S. Harward, Alan Klein, Steve Roark; Hallandale, Norman Moskowitz; Miami Beach, Stephen W. Unger; South Miami, Leonard A. Kalman; Tampa, Richard G. Connor, Americo A. Gonzalvo, Douglas Reintgen</i>
Georgia:	<i>Atlanta, R. Wayne Alexander, Crawford F. Barnett, Jr.</i>
Hawaii:	<i>Honolulu, Stanley Karansky, John Mickey; Kealahou, Thomas E. Austin; Wahiawa, Ned Stoughton</i>

Illinois:	<i>Barrington</i> , George Pepper; <i>Chicago</i> , John H. Buehler, Herbert Engelhard, George H. Gardner, Daniel J. Pachman, John D. Utley; <i>Elk Grove Village</i> , Gary E. Kay; <i>Geneva</i> , Charles A. Hanson; <i>Park Ridge</i> , Earl N. Solon
Indiana:	<i>Indianapolis</i> , C. Conrad Johnston, Jr.
Kansas:	<i>Lenexa</i> , David L. Smith
Louisiana:	<i>Baton Rouge</i> , Karen H. Miller; <i>New Orleans</i> , Nancy Haslett
Maryland:	<i>Baltimore</i> , William F. Cassano; <i>Olney</i> , Joseph Buffington
Massachusetts:	<i>Arlington</i> , K. Lea Sewell; <i>Belmont</i> , Lars Erickson; <i>Boston</i> , Ann W. Crosson, Christian T. Campos, Matthew W. Gillman, Paula Kadison, Richard Kopelman, Brit Nicholson, Stephen A. Sohn, Jayne Trachman; <i>Brockton</i> , Desiree Carlson; <i>Cambridge</i> , Paul N. Chervin; <i>Hyannis</i> , Linda A. Bishop; <i>Natick</i> , Gregg C. Checani; <i>Newton Centre</i> , Bernard Levy; <i>Wellesley</i> , George King; <i>Worcester</i> , Katherine S. Upchurch
Michigan:	<i>Detroit</i> , John J. Fath; <i>Flint</i> , Melissa Hamp; <i>Grosse Pointe</i> , John M. Lesesne
Minnesota:	<i>Minneapolis</i> , James Halikas
Missouri:	<i>Kansas City</i> , Gerry Woods; <i>Springfield</i> , C. Norman Shealy; <i>St. Louis</i> , Scott J. Anderson, W. Edwin Dodson; <i>Webster Groves</i> , Julia L. Stevens
Nebraska:	<i>Omaha</i> , Linda K. Matson
New Hampshire:	<i>Concord</i> , Joseph R. Snow; <i>Portsmouth</i> , Eric D. Lister
New Jersey:	<i>Hackensack</i> , Steven P. Honickman; <i>Moorestown</i> , Michael S. Entmacher; <i>Morristown</i> , Neal D. Shore; <i>Pompton Plains</i> , Charles W. Ross; <i>Princeton</i> , Timothy Patrick-Miller; <i>Summit</i> , Wayne S. Barber; <i>Watchung</i> , R. Christopher Stucky
New York:	<i>Bronx</i> , Steven R. Savona; <i>Ithaca</i> , John G. Maines; <i>New York</i> , David S. Goldman, Bruce Horten, Lenard E. Jacobson, Cynthia L. Krause, Michael J. Lepore, Nathan St. Amand, David N. Silvers; <i>Rhinebeck</i> , Catherine Toyte; <i>Rochester</i> , Phyllis C. Leppert, Douglas K. Slater
Ohio:	<i>Akron</i> , Robert W. Novak; <i>Cincinnati</i> , Donald Rucknagel; <i>Cleveland</i> , Stephen E. Alpert; <i>Columbus</i> , Miles E. Drake, Jr.; <i>Elyria</i> , William L. Hassler
Oklahoma:	<i>Oklahoma City</i> , James R. Gavin III, Richard L. Reece; <i>Tulsa</i> , James A. Young
Oregon:	<i>Portland</i> , Marcia Freed
Pennsylvania:	<i>Johnstown</i> , W. Frederick Mayer; <i>Philadelphia</i> , Christopher V. Chambers, Mary Ann Forciea, John J. Furth, David M. Goodner, James R. Harp, Richard I. Katz, Sheila M. Katz, Graham E. Quinn, Mona M. Shangold; <i>Pittsburgh</i> , Richard L. Green, Martin A. Morse, Michelle Roberts; <i>Rydal</i> , Anthony J. Limerakis; <i>State College</i> , Richard H. Dixon, Donald F. Mandetta; <i>Wallingford</i> , Cathy Wiley, Jim Wiley; <i>Wynnewood</i> , Frank Kern
Rhode Island:	<i>Lincoln</i> , Henry G. Magendantz; <i>Providence</i> , Benjamin T. Jackson
South Carolina:	<i>Columbia</i> , Ben Miller
Tennessee:	<i>Chattanooga</i> , Roger G. Vieth; <i>Memphis</i> , Peter D. Jones; <i>Nashville</i> , Alexander C. McLeod

Texas:

Dallas, Paul Pin, William Shapiro; *Galveston*, J. Andrew Grant, Jr.; *Houston*, Robert B. Bressler, Madeline Duvic, Kenneth Gould, Jr., Barry N. Hyman, Eugenia Kleinerman, Leonard A. Zwelling; *Plano*, Alan D. Davis

Utah:

Salt Lake City, Ralph Whatley

Vermont:

Norwich, John Modlin

Virginia:

Alexandria, Andrea M. Jackson; *Falls Church*, Thom A. Mayer

Washington:

Auburn, Joseph Gehrett; *Kirkland*, David Pitkethly; *Ren-ton*, Wallace H. J. Chang; *Seattle*, Gregory J. Raugi; *Woodinville*, Alice M. Ormsby



Financial Information



Fees and Expenses

Tuition Policy Statement. The Duke University School of Medicine's mission in medical education is to build upon our internationally-recognized tradition of excellence in training outstanding practitioners and physician-scientists who will be leaders in all fields of medicine. By selecting outstanding and dedicated students for matriculation, the school is committed to preparing physicians to respond to societal health needs. The School of Medicine has a policy of need-blind admission and adequate financial aid for those students with financial need. Tuition is set at a level which is competitive with schools of comparable quality and selectivity for admission. This tuition policy plus a financial aid program which protects against excessive student indebtedness permits the school of medicine to attract the most qualified students nationally and regionally regardless of the student applicant's personal or family financial status. It is important that tuition and financial aid are balanced to ensure that debt does not skew career choices of medical students once they graduate from the Medical School.

Tuition. The following table represents an estimate of a student's necessary expenses in the School of Medicine. The total of these figures suggests a basic minimum budget of approximately \$36,000. These are estimated figures only. Tuition and fees are subject to change without notice. Allowances for recreation, travel, clothing, and other miscellaneous items must be added to this estimate with allowances for individual needs and tastes.

Tuition Year 1	25,900
Tuition Year 2	25,900
Tuition Year 3	24,700
Tuition Year 4	22,600
Accident and Sickness Insurance+ (subject to change)	660
Laptop computer rental fee (per month)	130
First Year Fee+ (includes microscope rental, first year only)*	275
Annual Cost of Books and Supplies: first year	1,529
Annual Cost of Books and Supplies: second year	1,362
Annual Cost of Books and Supplies: third and fourth years	644
Lodging: first year	4,120
Lodging: second year	5,243
Lodging: third and fourth years	2,997
Board: first year	3,287
Board: second year	4,183
Board: third and fourth years	2,389
Student Health Service+ \$208 per semester	416
Student Government+ (Davison Society)	50
Continuation of Enrollment Fee‡ (per semester)	35
Graduate Student Fee+	14
Motor Vehicle Registration: car	120
Motor Vehicle Registration: motorcycle	31

*Sphygmomanometer, ophthalmoscope, otoscope, and other equipment required of each student must conform to rigid standards.

+Mandatory fees.

‡The School of Medicine encourages students to interrupt their studies to pursue approved research that is complementary to the medical curriculum at Duke or elsewhere for no credit. To retain full-time student status for loan deferment purposes, students may seek approval to enroll in the Continuation of Enrollment option. Only students eligible to be enrolled at Duke during the applicable time period may participate.

Tuition and fees are payable on a semester basis and students are required to pay full tuition for four years as a requirement for graduation. For the freshman year, one-half of the annual tuition and fees is billed in July and the other one-half in December. Students who must repeat 60 percent or more of the required first year courses pay full tuition while prorated tuition is paid by those repeating less than 60 percent of those courses. Second year students are billed at the rate of one-sixth of the annual tuition and fees for each eight-week rotation and one-twelfth of the annual tuition and fees for each four-week rotation. (The six-week psychiatry rotation and the two-week cost effective care rotation are billed as one eight-week block.) Juniors and seniors are billed for a total of sixty-four credits during the elective years. Distribution of tuition charges depends upon the number of credits for which a student is registered each term. Annual cost per credit is obtained by dividing the tuition by thirty-two, half the number of elective credits required for graduation. No tuition is charged for elective credit taken in excess of the sixty-four required to obtain the M.D. degree provided the credit is taken within the same semester in which the student completes graduation requirements. Please note, however, that the student is no longer eligible to receive financial aid funding after he or she has completed the sixty-four elective credits.

Payment of Accounts for Fall and Spring. Monthly invoices for tuition, fees, and other charges are sent by the bursar's office and are payable upon receipt but no later than the late payment date. As a part of the agreement of admission to Duke University, a student is required to pay all invoices as presented. If full payment is not received by the late payment date, a late payment charge as described below is assessed on the next invoice and certain restrictions as stated below are applied. Failure to receive an invoice does not warrant exemption from the payment of tuition and fees nor from the penalties and restrictions. Nonregistered students are required to make payment at the time of registration for tuition and fees and any past due balance on the account.

Monthly Payment Option. The Monthly Payment Option Plan allows students and their parents to pay all or part of the academic years expenses in ten equal monthly payments from July 1 to April 1. The only cost is an annual, nonrefundable fee of \$95.00. The participation fee can be paid by Visa or MasterCard. Payments may be made by check or by bank draft. Questions regarding this plan should be directed to Tuition Management Services, 1-800-722-4867 or 401-849-1550. At renewal, the plan can be extended to twelve months. The monthly payments can be increased or decreased without additional cost.

Late Payment Charge. If the "Total Amount Due" on an invoice is not received by the late payment date, the next invoice shows a penalty charge of 1 1/4 percent per month assessed on the past due balance regardless of the number of days past due. The "Past Due Balance" is defined as the previous balance less any payments and credits received on or before the late payment date and also any student loan memo credits related to the previous balance which appear on the invoice. The amount of the 1 1/4 percent penalty charge is the same regardless of the number of days payment is received after the late payment date.

Restrictions. An individual is in default if the total amount due is not paid in full by the due date. A student in default is not allowed to register for classes, receive a transcript of academic records, have academic credits certified, be granted a leave of absence, or receive a diploma at graduation. In addition, an individual in default may be subject to withdrawal from school and have the account referred to a collection agency. If an account is referred to a collection agency, the individual is responsible for all applicable collection and/or court costs.

No credit is given for any term in which the tuition has not been paid, whether the work has been at Duke or elsewhere. It is not advisable for students to attempt outside work to defray their expenses during the academic year. Spouses of medical students desiring employment may secure information from the Duke University Personnel Office.

Fall and Spring Refunds. Tuition and fees refunds are governed by the following policy:

1. In the event of death a full tuition and fees refund are granted.
2. In all other cases of withdrawal or leave of absence, students or their parents may elect to have tuition refunded or carried forward as a credit for later study according to the following schedule:
 - a. withdrawal before the beginning of classes—full refund;
 - b. withdrawal during the first or second week—80 percent;
 - c. withdrawal during the third through fifth week—60 percent;
 - d. withdrawal during the sixth week—20 percent;
 - e. withdrawal after the sixth week—no refund;
 - f. tuition charges paid from grants or loans are restored to those funds on the same pro rata basis and are not refunded or carried forward.
3. In the case of changing enrollment category from full-time to part-time, dropping special fee courses (music, art, golf, etc.), or dropping audit courses, a full refund is granted during the drop/add period. Subsequent to the drop/add period changes of category are not allowed. Students may, however, withdraw from courses after the drop/add period with no refund or add new courses if the proper tuition is paid.

Because Duke University participates in Title IV federal aid programs, it follows federal guidelines with respect to the refund and repayment of these funds. All first time students who have their charges and financial aid adjusted according to the federal regulations. Additional information regarding this procedure may be obtained from the Office of Financial Aid.

Continuation of Enrollment Option Fee. The School of Medicine encourages students to interrupt their studies to pursue approved research that is complementary to the medical curriculum either at Duke or elsewhere for no credit. Full-time student status can be retained for a maximum period of two years during these periods of study if approval is obtained from the appropriate officials and the student registers for and pays an enrollment fee of \$35 for each semester or part of a semester away. No refund of any portion of the fee is allowed for students who subsequently withdraw from the School of Medicine.

Although considered to be full-time by the Duke School of Medicine, financial aid recipients should be aware that such status may not be recognized by all lenders for loan deferment purposes.

Only students eligible to be enrolled at Duke during the applicable time period may participate in this option.

Transcripts. Requests for transcripts of academic records should be directed to the Office of the Medical Center Registrar, Box 3878 DUMC. A fee of three dollars, payable in advance, is charged for each copy. However, the transcript fee is waived for financially needy students who require transcripts to apply for external funding. After graduation from the School of Medicine, transcripts of deans' letters may also be obtained from the Office of the Registrar for the fee of one dollar per copy.

Living Accommodations

Housing Costs. For the 1997-98 academic year, rental rates for the first-year medical student are projected to be \$4,677 for the Town House apartments. Utility charges, except telephone, are included in these rates. Rates are per person per academic year.

Rental rates in Central Campus Apartments for the 1997-98 academic year are projected to range from \$3,971 to \$6,129 for first-year medical students. Utility charges,

except telephone, are included in the Central Campus Apartment rates. Rates are per person per academic year.

Food and Other Expenses. Duke Dining Services and Duke University Store operations are located on campus to service the needs of the Duke community. For the convenience of students, the university identification card, called The DukeCard, can be used to access prepaid accounts and make purchases in these facilities.

There are two kinds of accounts: the dining account, which can be used for food purchases only, and the flexible spending account, which can be used to purchase not only food, but any items sold by Duke stores, such as books, supplies, laundry services, health and beauty aids, and more. These campus retail operations also accept cash.

For more information about establishing an account, contact The DukeCard Office, 024 Union West, Box 90911, Durham, North Carolina 27708-0911, 919/684-5800.

Motor Vehicle Registration

Each motor vehicle operated on Duke University campuses by students enrolled in the School of Medicine must be registered at the Medical Center Traffic Office, PRT Level, Parking Deck II, within five days after operation on the campus begins, and thereafter must display the proper registration decal.

All students must pay an annual fee of \$120 for each four-wheeled motor vehicle and \$31 for each motorbike or motor scooter registered. Bicycles are registered free of charge at the Public Safety Department, 2010 Campus Drive.

To register a vehicle, the student must present a valid state registration for each vehicle registered and a valid state operator's license.

Parking, traffic, and safety regulations are given each student at the time of registration of the vehicle(s). Students are expected to abide by these regulations.

Merit Awards for Medical Students

The School of Medicine offers awards to students from the following scholarships based solely on academic excellence:

William G. Anlyan, M.D. Scholarship, established 1988 by gifts from faculty, staff and friends.

Barham Endowed Merit Fund, established November, 1984, by gift from Mr. and Mrs. Joseph Barham, Oak Ridge, Louisiana.

Family Dollar Scholarship, established November, 1984, by gift from Mr. Leon Levine, Chairman of the Board, Family Dollar Stores, Inc., Charlotte, North Carolina; for minority students.

Dr. William Redin Kirk Memorial Trust for North Carolinians, established March, 1984, by bequest of Mr. Frederick H. Pierce, Owensboro, Kentucky.

Mary W. and Foster G. McGaw Scholarship, established February, 1986 by bequest from Foster G. McGaw.

Dr. Kenneth L. Pickrell Scholarship, established February, 1984, by gift from the Department of Surgery, Duke University Medical Center, for an entering student.

School of Medicine Merit Fund, established 1984 by gifts from medical alumni, students, and American Medical Association-Education and Research Foundation.

Senior Scholarships from the above funds (except Pickrell) are offered to third year students for use during their fourth year of study. Selection by a special committee is based on outstanding academic achievement and extracurricular activities during the first two years of medical school. These scholarships, to be paid toward tuition, are in the range of \$5,000 each for ten awards, and are not in addition to any other tuition award.

Financial need is not a criteria for selection; however, applicants who feel their financial need is greater than the merit award may apply for financial aid.

The Dean's Tuition Scholarships. Seven Dean's Tuition Scholarships in the amount of current tuition are given to academically excellent freshmen minority students each year. Preference is given to residents of North Carolina. Selection is made by the dean based on recommendations from the Medical School Admissions Office. Annual renewal is contingent upon satisfactory academic progress.

Medical Student Research Scholarships

Several groups now sponsor medical student research scholarships. In most of the scholarship programs, students selected for scholarships are eligible to receive thirty-two basic science credits for the experience.

Some have delegated the responsibility to the Medical School to select participants in the program, others have their own independent selection processes. A full twelve months is required for the research experience. Selection for the following awards is made by the Student Research Scholarship Committee.

Gorrell Award for Research in Psychosis. The Gorrell Research Award provides studies on mechanisms underlying psychosis, particularly schizophrenia and bipolar illnesses. Emphasis is on research of the processes that elucidate the behavioral neurobiology of psychosis. For any questions regarding the award or to obtain an application, please call Dr. Everett Ellinwood or Peg Musser at 684-3329, Room 212 Sands Building. Two stipends are available per year. The amount of each stipend for the 1997-98 academic year is \$10,000. The deadline for submission is the same as for the other Duke S.R.S.P.'s. *All Gorrell scholar preceptors must have their primary academic appointment in psychiatry or in one of the basic science department.*

Eugene A. Stead Student Research Scholarship Program. This program has included forty Duke students during its first ten years. The three scholarships have been endowed by grateful patients of Drs. James Clapp and Andrew Wallace, and students and colleagues of Dr. Stead. There is an annual breakfast meeting in which Stead scholars who have completed their research training discuss their work with first year students.

Stanley J. Sarnoff Society of Fellows for Research in Cardiovascular Sciences. Ten students are chosen nationally for a full twelve-month research experience in the cardiovascular area, away from their parent medical school. Duke has typically had one position in this program. The program is in its sixteenth year and there is a great deal of esprit de corps within the "Sarnoff Society of Cardiovascular Fellows". There is an annual meeting in Bethesda, Maryland, in which the ten fellows engaged in research during that year present their work, fellows who have completed their research year talk about their developing career plans, and newly selected fellows learn about possible research opportunities.

The American Heart Association Medical Student Research Fellowship Program. Duke is one of twenty-five schools selected by the American Heart Association for one of their Student Research Scholarship Programs. Two positions each year are available. These scholarships differ from all others in that the funding organization does not permit the student to receive academic credit while they are American Heart Scholars. Therefore, these scholarships have been used by students who had rewarding experiences during their basic science elective year in cardiovascular research and then chose to add a second dedicated research year before completing their clinical elective year as a Duke medical student.

The Four Schools Physician Scientist Program. The Four Schools Physician Scientist Program includes one student from each of the following schools: Duke, Penn, Washington University, and Johns Hopkins. The four students selected travel together to visit laboratories at each of the four institutions. Following graduation, the student is assured two years clinical internal medicine training and guidance in securing a position for two years of research training at one of the four institutions. This is an overall six year program designed for individuals with a strong interest in academic career development in internal medicine.

All students applying to these programs prepare their applications and receive interviews during the second year of medical school. Announcements of the scholarship recipients are made in April.

In addition, there are other foundations which support student research scholarship programs and are approved for Duke University School of Medicine credit but have their own methods for evaluation and selection. Because of the unique nature of the Duke University School of Medicine curriculum, we have been highly successful in having students in the various programs. The Howard Hughes/National Institutes of Health Research Scholars Program requires that the student works in a particular institution away from their parent medical school. The Hughes/NIH program selects thirty students each year to live on the NIH campus and work in one of their basic science laboratories. We have also been very successful in having our students in scholarship programs supported by the Few Foundation, Arthritis Foundation, the Pharmaceutical Manufacturers Foundation, and the Fight for Sight Foundation.

Financial Aid

The Duke University School of Medicine makes financial assistance available to accepted students who due to economic circumstances could not otherwise attend the university. The school recognizes, however, the responsibility of the individual and the family to provide funds to achieve the objective of a medical education. Thus, the school does not consider parents to have discharged the full financial obligation for the continuing education of their sons or daughters upon the latter's completion of the undergraduate degree.

Financial assistance is available in a combined form of grants and loans, and all awards are made on the basis of demonstrated need to eligible U. S. citizens.

Duke University School of Medicine reserves the right to decline to approve loan applications for those applicants who do not have a satisfactory credit history. U.S. citizenship or permanent residence visa is required of all students receiving loans through the school.

It is the responsibility of recipients of financial aid to keep the Medical Center Office of Financial Aid informed of any outside financial assistance they may receive. It must be understood that the school reserves the right to reconsider its offer of financial assistance in the event of a major outside award to a recipient. No financial aid funds may be used during a period when the recipient is not involved with work toward the degree. Less than half-time or special students are not eligible for financial aid.

Financial Assistance to Incoming First Year Students. A financial aid application packet is routinely mailed in February to applicants who have been accepted. This mailing is without regard to whether the applicant expresses an interest in assistance on the application for admission. The economic circumstance of the applicant has no bearing on whether the applicant is accepted into the medical school.

The applicant requesting financial aid is expected to work during the summer preceding entrance into medical school and to save part of those earnings to defray a portion of the first-year expenses.

The applicant's need is determined before an award is made. The Office of Financial Aid, therefore, requires the Duke University Medical Center application for financial aid, and computations from *Need Access*, in addition to the Free Application for Federal Student Aid (FAFSA). Copies of federal income tax returns with supplemental schedules are required as part of the financial aid application.

An official aid award notice is sent to the accepted applicant within a few days after receipt of the required forms. Awards are conditional until all required documents are received.



Financial Assistance to Upperclassmen. Annual reapplication is required of all need based aid recipients. Upperclassmen seeking financial assistance for the first time may consult with the Director of Financial Aid.

Duke University Medical Center Endowed Funds.

Barney Baker and Minnie P. Baker Endowed Scholarship Fund, established March, 1992, by bequest of their son Barry Baker.

Charles W. Banner Loan Fund, established in 1953 by a gift from Mrs. Edward B. Benjamin. *Germain Bernard Scholarship*, established in 1959 by the B. C. Remedy Company.

Thomas C. Bost Scholarship, established in 1965 by a gift from Dr. Thomas C. Bost, supplemented by subsequent gifts.

Franklin and Louise Brown Medical Scholarship, established March, 1992, by bequest of Franklin and Louise Brown.

Elizabeth Burgess Bressler Memorial Scholarship Fund, established in 1983 by her children: Garrett S. Bressler, M.D.; Robert B. Bressler, M.D.; Barbara B. Marques; Peter B. Bressler, M.D.

Ortrude S. Busse Medical Scholarship Endowment, established in 1993 by gift from her husband, Ewald W. Busse, M.D.

James L. Clark Memorial Scholarship, established in 1965 by a gift from Mr. and Mrs. Marvin D. Clark and supplemented by gifts from other donors.

C. T. Council Scholarship, established in 1959 by the B. C. Remedy Company.

Helen M. Curtis Endowed Scholarship Fund, established June, 1992, from the estate of Helen M. Curtis.

John H. Dorminy Scholarship, established in 1980 by gift from John H. Dorminy, Jr.

Isobel Craven Drill Endowment for Medical School Scholarships, established 1993 by Isobel Craven Drill.

Herbert T. Dukes, M.D. Memorial Loan Fund, established in 1983 by his classmates and friends.

Eagles-Andrews Memorial Scholarship, established in 1982 by a gift from Dr. and Mrs. William M. Eagles.

William F. Franck Memorial Scholarship, established in 1958 by gift from William F. Franck, Jr. '39, and supplemented by additional gifts.

Henry Garris Scholarship Fund, established 1995, from the estate of his widow Jean S. Garris.

Constance I. Gottwald Medical Scholarship, established 1987 with preference for minority students by gift from Constance I. Gottwald.

Hazel Endowment Fund, established 1984 by gift from Mr. and Mrs. William A. Hazel.

Warren W. Hobbie Fund, established in 1980 by trustees of the Warren W. Hobbie Charitable Trust.

Earl P. Holt, Jr. Memorial Scholarship, established 1986 by gift from family and friends for first or second year medical students with preference given to minority students.

George Lee Hundley and Rebecca Barnhill Hundley Fund, established in 1980 by gift from George Lee and Rebecca Barnhill Hundley.

H. B. and Adelaide F. Ingle Medical Scholarship, established in 1976 by gift from Mr. and Mrs. Harry B. Ingle.

B. Everett Jordan Scholarship, established in 1974 by the late Senator B. Everett Jordan and his widow, Katherine Jordan.

Thomas D. Kinney, M.D. Memorial Scholarship, established in 1980 by gifts from his widow, Dr. Eleanor R. Kinney, and their children: Thomas R. Kinney, M.D.; Eleanor D. Kinney, J.D.; Hannah C. Kinney, M.D.; and Janet S. Kinney, M.D.

Dr. John Haden Lane Memorial Scholarship, established in 1968 by gift from Edward H. Lane Foundation.

E. C. Langston Medical Scholarship, established in 1979 by bequest of Mrs. Denzil L. Mosteller.

Paul E. Leviton Medical Scholarship, established in 1981 from the estate of Paul E. Leviton.

James Cecil McGehee Memorial Medical Scholarship, established in 1975 by gift from C. G. McGehee, Jr.

Medical Alumni/Alumni Fund Scholarship Fund Quasi Endowment, established 1995.

Medical Alumni Scholarship, established in 1974 by Duke Medical Alumni.

Medical School Annual/Alumni Gifts Scholarship, established 1994.

Medical School Faculty Wives Scholarship, established in 1968 by a gift from the Medical School faculty wives whose source of funds is proceeds from the Nearly New Shoppe.

John F. Ott Endowment Fund, established in 1984 by bequest of John F. Ott, M.D., 1943.

Henry A. Page Scholarship Fund, established 1942 by gift from Henry A. Page, Jr., and Gertrude Wetherill Page.

Physical Medicine Scholarship, established in 1963 by gift from Central Carolina Convalescent Hospital, Inc., Greensboro, North Carolina.

Queen Effat Muhammed Al Thenayan Medical Scholarship Endowment, established 1993 by gift from Her Royal Highness Queen Effat Muhammed Al Thenayan.

Radiological Science Medical Student Loan Fund, established in 1980 by the Department of Radiology.

Senior Class Gift, established by graduates of classes of 1977 and 1978.

Melvin D. and Judith N. Small Medical School Scholarship Fund, established in 1976 by gift from Dr. Melvin D. and Mrs. Judith N. Small.

Sigmund Sternberger Endowment Fund, established in 1978 by gift from the Sigmund Sternberger Foundation, Inc., Greensboro, North Carolina.

William E. Stevens, Jr. Scholarship, established in 1983 by the Broyhill Foundation, Lenoir, North Carolina.

B. W. Stiles Scholarship, established in 1981 by gift from the Mary Duke Biddle Foundation.

Francis and Elizabeth Swett Scholarship, established in 1966 by gift from the late Dr. and Mrs. Swett.

A.J. Tannenbaum, M.D. Medical Scholarship Endowment Fund, established November, 1995 by the Trustees of the Sigmund Sternberger Foundation, Inc., Greensboro, North Carolina.

Larry and Violet H. Turner Scholarship, established 1977 by gift from Drs. Larry and Violet H. Turner.

Dr. Hillory M. Wilder Memorial Scholarship, established in 1962 by bequest from Celeste Wilder Blake and Kenneth M. Blake.

Roland R. and Ray R. Wilkins Medical Scholarship Quasi Endowment, established December 1995 from reserves of the Estate Planning Council.

Sue Eggleston Woodward Memorial Scholarship, established in 1966 by gifts from parents, relatives, and friends.

Vivian Zirkle Memorial Scholarship, established in 1981 by gift from Drs. Lewis and Sara Zirkle.

Other Medical School Scholarships. Mary Duke Biddle Foundation Scholarships, Duke University School of Medicine Scholarships, State of North Carolina (tuition remission up to \$2,000), and the Lettie Pate Whitehead Foundation.

Federal Scholarships. Armed Forces (Army, Navy, and Air Force) Scholarship programs may be available for accepted or enrolled students. The recipient receives full tuition, fees, and a monthly stipend in return for a commitment of service as a physician for each year of funding. The special application is made directly to the program in which the student is interested.

Scholarships for Students of Exceptional Financial Need (EFN). This federally funded program provides grant assistance to schools for students who qualify on the basis of federal criteria. Recipients, who are selected by the school, must be those who meet federal criteria for the grants. The selected student receives tuition and all other reasonable educational expenses (minus living expenses). Recipients must enter and complete a residency training program in a primary health care specialty not later than four years after completing the undergraduate medical education program; and, practice in the primary health care specialty for five years after completing the residency program. Students who fail to maintain an acceptable level of academic standing and graduates who fail to comply with the primary care requirements are liable to the federal government for the amount of the EFN award and for interest on such amount at the maximum legal prevailing rate not later than three years after the date on which the individual breaches the agreement.

Financial Aid for Disadvantaged Health Professions Students (FADHPS). Recipients of this federally funded grant program are selected by the school on the basis of federal criteria. The selected student must be from a disadvantaged environment or from a low income family as described by federal regulations. Recipients of FADHPS scholarships must agree to meet the same primary health care service requirements as required of EFN scholarship recipients described above.

Scholarships for Disadvantaged Students (SDS) and Loans for Disadvantaged Students (LDS). Duke University School of Medicine does not participate in these two programs.

Primary Care Loan (PCL) was formerly known as *U. S. Health Professions Student Loan (HPSL)*. Recipients must agree to enter and complete a residency training program in primary health care not later than four years after the date on which the student graduates from the school, and must practice in such care through the date on which the loan is repaid in full. Students who received their first HPSL funds before July 1, 1993, are exempt from this requirement.

If the borrower fails to complete a primary health care residency and to practice in a primary health care field, the loan balance is recomputed from the date of issuance at an interest rate of 12 percent per year, compounded annually, instead of five percent.

North Carolina Board of Governors Medical Scholarships. Board of Governors Medical Scholarships (BGMS) are awarded annually to twenty first-year medical school candidates who have been accepted for admission at one of the four medical schools in North Carolina. BGMS recipients are selected from among candidates of all races who are financially disadvantaged state residents and who have expressed an interest in practicing medicine in the State of North Carolina. The awards provide a yearly stipend of \$5,000 plus tuition and all mandatory fees except the Sickness and Accident Insurance, which is covered if sufficient funds are available. The BGMS may be renewed for three years if the recipient continues to demonstrate financial need and maintains satisfactory academic progress. Information about the scholarship may be obtained from the Financial Aid Office.

Loans

University loans are available under the specific restrictions of the loan funds and are awarded on the basis of financial need. Some of them are: W. K. Kellogg Foundation Loan Fund, Seaborn L. Hardman Loan Fund, Medical Freshman Tuition Loan, Scott Loan Fund, Charles W. Banner Loan Fund, Carl Perkins Student Loans, Radiological Science Medical Student Loan Fund, U. S. Health Professions Student Loans, and Primary Care Loans.

The Francis and Elizabeth Swett Loan Fund is an emergency loan available in small amounts to any medical student on a no-interest basis for a short period of time.

Loans from Outside the University

North Carolina Student Loan Program for Health, Science, and Mathematics. These loans provide financial assistance to North Carolina residents who demonstrate need as determined by the North Carolina State Education Assistance Authority. Loans are available for study in the medical fields, mathematics, and science programs that lead to a degree. The applicant must be a domiciliary of North Carolina and accepted as a full-time student in an accredited associate, baccalaureate, master's, or doctoral program leading to a degree. Loan recipients in some professional or allied health programs may cancel their loans through approved service in shortage areas, public institutions, or private practice. Medical students may receive up to \$8,500 per year for each of the four years; master's degree students are eligible for two loans of up to \$6,500 each; bachelor's degree students are eligible for three loans of up to \$5,000 each. For application forms and more information write: Executive Secretary, North Carolina Student Loan Program for Health, Science, and Mathematics, P. O. Box 20549, Raleigh, North Carolina 27619-0549, or telephone 919/571-4178.

Federal Stafford Student Loans. The Federal Stafford Student Loan is available to eligible students through many home-town banks and/or state agencies. For purposes of Federal Stafford Loans and other Title IV funds, graduate and professional students are financially independent of parents. The annual maximums for medical students are \$8,500 subsidized and \$10,000 unsubsidized. The aggregate maximums are \$65,500 subsidized and \$138,500 unsubsidized (minus the subsidized amount). The interest is paid by the federal government on the subsidized SSL until repayment begins six months after graduation. On the unsubsidized SSL, the borrower is responsible for the interest which may be paid or deferred during the enrollment period. Eligibility for the subsidized and unsubsidized SSL is determined by the financial aid office based on the SAR from FAFSA.

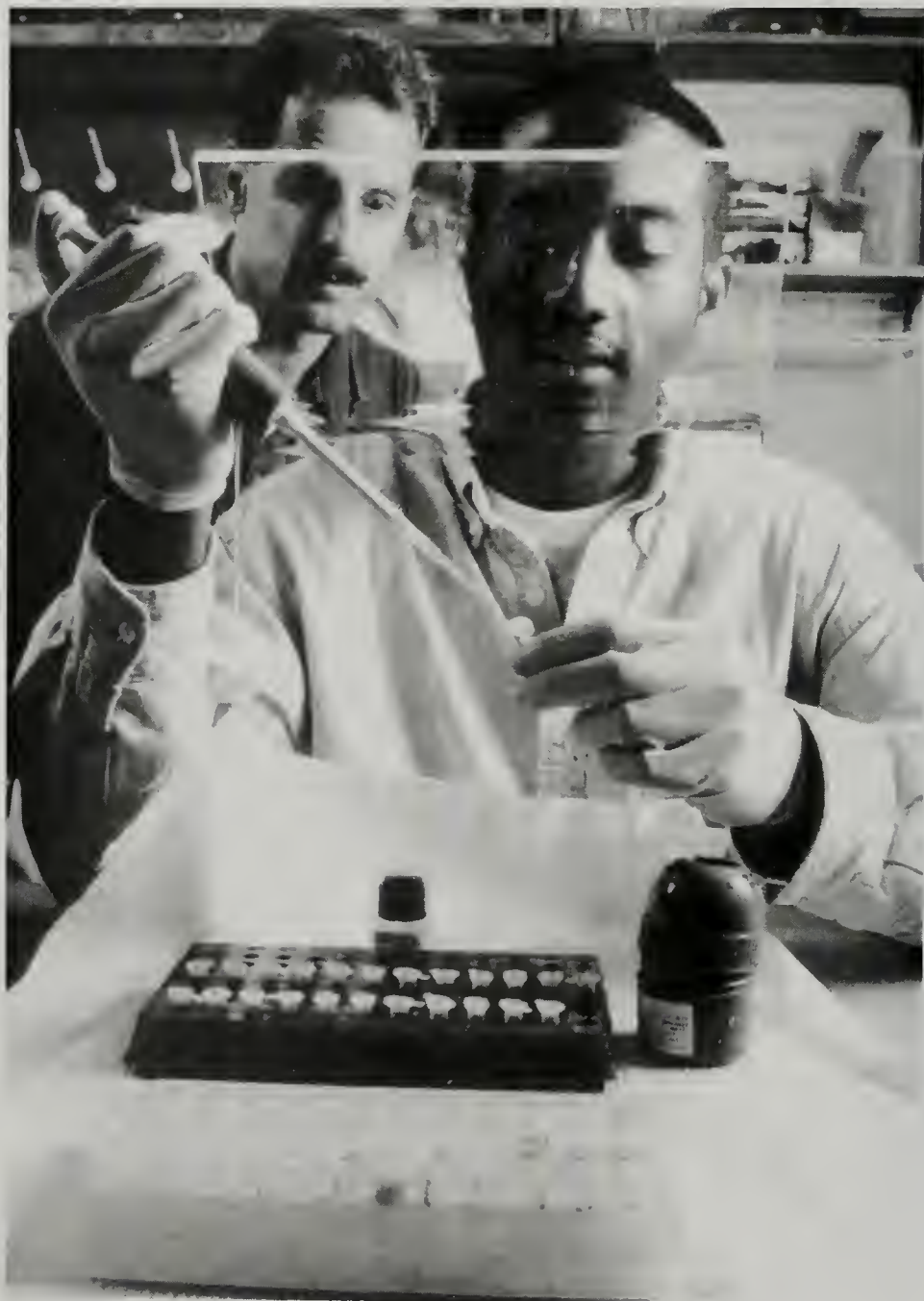
There is a two year deferment of repayment for residency training for those who first borrowed prior to July 1, 1993. First-time borrowers *after* July 1, 1993, are not eligible for the two-year deferment of repayment for residency training.

Effective July 1, 1994, the loan origination fee is 3 percent, paid by the borrower on the amount of the loan; the fee is deducted from loan disbursements. Also effective at the same time is a 1 percent insurance fee deducted from the loan disbursements.

When repayment begins, the interest for those who first borrowed prior to October 1, 1992 is 8 percent during the first four years and 10 percent beginning with year five of the repayment period. For first time borrowers after October 1, 1992, the interest rate is annual variable based on a 91-day Treasury Bill plus 3.10 percent capped at 9 percent. Those who first borrow after July 1, 1994 have an interest cap of 8.25 percent.

Additional information may be obtained by writing to Office of Financial Aid, Box 3067 DUMC, Durham, North Carolina 27710.

Courses of Instruction



Anesthesiology

Professor: Joseph G. Reves, M.D. (Med. Univ. South Carolina, 1969), M.S. (Alabama-Birmingham, 1973), *Chairman*.

Professors: Peter B. Bennett, Ph.D., D.Sc. (Southampton, 1984); William J. Murray, M.D. (North Carolina, 1962), Ph.D. (Wisconsin, 1955); Bruno J. Urban, M.D. (Albertus Magnus, Germany, 1960); David S. Warner, M.D. (Wisconsin, 1980); Stanley W. Weitzner, M.D. (New York Univ., 1953).

Clinical Professor: Norbertus P. de Bruijn, M.D. (Groningen, 1976).

Professor of the Practice of Experimental Anesthesiology: David W. Amory, M.D., Ph.D. (British Columbia 1967, Washington, 1961).

Associate Professors: Cecil O. Borel, M.D. (Hahnemann, 1977); Brian Ginsberg, M.B., B.Ch. (Witwatersrand, 1975); Peter S. Glass, M.B., B.Ch. (Witwatersrand, 1976); Peter C. Huttemeier, M.D., Ph.D. (Copenhagen, 1977, 1989); Frank H. Kern, M.D. (Pennsylvania, 1987); Bruce J. Leone, M.D. (Florida, 1982); David A. Lubarsky, M.D. (Washington Univ., 1984); Jonathan B. Mark, M.D. (Stanford, 1978); Jon N. Meliones, M.D. (Tufts, 1984); Richard E. Moon, M.D., C.M. (McGill, 1973), M.Sc. (Toronto, 1979); Mark F. Newman, M.D. (Louisville, 1985); Donald H. Penning, M.D. (Queens Univ., Canada, 1983); Robert L. Reed, M.D. (Virginia 1976); Debra A. Schwinn, M.D. (Stanford, 1983); Sidney A. Simon, Ph.D. (Northwestern, 1973); Robert N. Sladen, M.B., Ch.B. (Cape Town, South Africa, 1970), M.R.C.P. (Royal Postgrad. Med. Sch. 1973).

Associate Clinical Professors: Fiona Clements, M.D. (Duke, 1975); Kerri M. Robertson, M.D., F.R.C.P.(c) (British Columbia, 1980); Dianne L. Scott, M.D. (North Carolina, 1978).

Assistant Professors: Elizabeth A. Bell, M.D. (North Carolina, 1990); Andrew T. Canada, Pharm.D. (Philadelphia Coll. of Pharmacy and Science, 1968), Ph.D. (Massachusetts, 1985); Guy de Lisle Dear, M.B., Ch.B. (St. George's Hospital, England, 1979); Mark E. Dentz, M.D. (Michigan, 1989); Ronald D. Edgar, M.D. (Manitoba, 1981); T. J. Gan, M.B., B.S., D.A., F.C.Anes. (London Hosp. Med. Coll., 1986); Joel S. Goldberg, M.D. (Duke, 1977); Roy A. Greengrass, M.D., F.R.C.P.(c) (Manitoba, 1973); Katherine P. Grichnik, M.D. (Tufts, 1987); John Guy, M.D. (Montreal, 1989); H. David Hardman, M.D. (Minnesota, 1981); Andrew K. Hilton, M.B., B.S. (New South Wales, Australia, 1983); Lewis R. Hodgins, M.D. (SUNY-Downstate, 1985); Rajiv Jhaveri, M.D. (Gujarat Univ., India, 1977); Madan M. Kwatra, Ph.D. (Montreal, 1977); Catherine K. Lineberger, M.D. (North Carolina, 1987); Judith O. Margolis, M.D. (Colorado, 1984); Stephen Parrillo, M.D. (Bologna, Italy, 1982); Claude Piantadosi, M.D. (John Hopkins, 1975); James D. Reynolds, Ph.D. (Queens Univ., Canada, 1994); Allison L. Ross, M.D. (Marshall, 1988); Scott R. Schulman, M.D. (George Washington, 1982); Karen S. Sibert, M.D. (Baylor, 1983); Thomas F. Slaughter, M.D. (Duke, 1987); Mark Stafford Smith, M.D., C.M. (McGill, 1983); Susan Steele, M.D. (Illinois, 1983); Bryant W. Stolp, M.D. (North Carolina, 1988); Barbara E. Tardiff, M.D. (Yale, 1983); Timothy H. Webb, M.D., Ph.D. (Texas-San Antonio, 1980, 1974); Christopher C. Young, M.D. (New York Med. Coll., 1987).

Assistant Clinical Professors: Peter D. Dane, M.D., C.M. (McGill, 1967); Robert L. Coleman, M.D. (Virginia, 1984); Francine D'Ercole, M.D. (Med. Coll. Pennsylvania, 1989); Jennifer T. Fortney, M.D. (Maryland, 1978); Katherine P. King, M.D. (North Carolina, 1988); Andrew F. Meyer, M.D. (SUNY-Downstate, 1969); Ziaur Rahman, M.B., B.S. (Prince of Wales Med.Center, India, 1968); William F. Spillane, M.D. (New Jersey, 1984).

Assistant Research Professors: Barry W. Allen, Ph.D. (Duke, 1984); Wayne A. Gerth, Ph.D. (California-San Diego, 1979); Lieju Liu, M.D., M.B., M.S. (Tongji Med. Univ., China, 1978, 1981); Ying-Fu-Su, Ph.D. (Colorado, 1978); Richard Vann, Ph.D. (Duke, 1976).

Associates: Helen Benveniste, M.D., Ph.D. (Copenhagen, 1986, 1991); Gregory H. Botz, M.D. (George Washington, 1990); Veeraindar Goli, M.B., B.S. (Osmania Med. Coll., Hyderabad, India, 1978); Timothy A. Heine, M.D. (Louisville, 1988); Amy Beth Hilton, M.D. (Brown, 1988); Scott T. Howell, M.D. (Duke, 1986); Stephen P. Kantrow, M.D. (Louisiana State, 1988); Stephen M. Klein, M.D. (New Jersey, 1992); Nancy W. Knudsen, M.D. (Missouri, 1991); Mark L. Phillips, M.D. (Bowman Gray, 1980); Iain Sanderson, M.A., M.Sc., F.R.C.A. Anaes. (Oxford, 1985); Dana N. Weiner, M.D. (Duke, 1989).

Visiting Associates: Ratan Alexander, M.B., B.S. (St. Bartholemew's Med. Sch., London, 1987); Joseph E. Arrowsmith, M.B., B.S. (London, 1985); John V. Booth, M.B., B.S. (Glasgow, 1989); Jonathan C. deLima, M.B., B.S. (Sydney, 1985); Nigel Eastwood, M.B., B.S., B.Sc. (London, 1986); Paul D. Eckenbrecht, M.D. (Jefferson, 1980); Jana A. Faehrich, M.D. (Zurich, 1983); Robert P. Hill, M.B., B.S. (St. George's Hosp., London, 1990); Corey W. T. Sawchuk, M.D. (Manitoba, Canada, 1987); Howard G. Wakeling, M.B., B.S., M.R.C.P., F.R.C.A. (Middlesex Hosp. Med. Sch., London, 1988); Ian J. Welsby, M.B., B.S., F.R.C.A. (London, 1990); Susan J. Wright, M.B., B.S. (Middlesex Hosp. Med. Sch., London, 1984).

Adjunct Professor: Kwen Jen Chang, Ph.D. (SUNY-Buffalo, 1972).

Adjunct Assistant Professor: Fritz F. Klein, Ph.D. (Duke, 1973).

Assistant Consulting Professors: John D. Buckwalter, M.D. (North Carolina, 1982); Frederick J. Carpenter, M.D. (Wisconsin, 1982); John J. Freiberger, M.D. (Southwestern, 1979); James R. Jacobs, M.D. (Duke, 1985), Ph.D. (Alabama, 1987); Moya E. Kileff, M.D. (Birmingham, England, 1973); Edward Burt McKenzie, Jr., M.D. (North Carolina, 1985); C.P. Reddy Parvata, M.D. (Inst. of Med.

Sciences, India, 1966); Gary Lee Pellom, M.D. (North Carolina, 1984); Edward G. Sanders, M.D. (North Carolina, 1985); Paul V. Stankus, M.D. (North Carolina, 1976); Thomas E. Stanley III, M.D. (Duke, 1981); Cathy N. Thomas, M.D. (North Carolina, 1984); Rolf B. Wallin, M.D. (North Carolina, 1984). Consulting Associates: David S. Bacon, M.D. (Duke, 1990); James M. Chimiak, M.D. (North Carolina, 1986).

Research Associates: Josh Frederick, Ph.D. (Duke, 1995); Andrea G. Gillian, Ph.D. (South Carolina, 1996); Marsella Lanzinger, M.D. (Munich, 1995); Lingyuan Li, Ph.D. (Peking Union Med. Coll., 1953); Yoshihide Miura, M.D. (Yamagata Univ., Japan, 1989); Kinya Nishimura, M.D. (Juntendo Univ., Japan, 1993); Janet E. Pittman, M.D. (Arizona, 1988); Mona A. Razik, Ph.D. (North Carolina, 1996); Charlene D. Richardson, Ph.D. (Texas A&M, 1994); Eric D. Roush, Ph.D. (Duke, 1994); Xiaowen (Sharon) Rudner, Ph.D. (Wayne State, 1992); Huaxin Sheng, M.D. (Nantong Med. Coll., 1984); James B. Streisand, M.D. (SUNY- Buffalo, 1984); Kengo Warabi, M.D. (Juntendo Univ., Japan, 1993); Ke Wei, Ph.D. (Texas A&M, 1991); William White, M.P.H. (North Carolina, 1988); Bo Wu, M.D. (China Med. Univ., 1985).

Scholar in Residence: Kenneth Sugioka, M.D. (Washington, 1949).

Visiting Scholar: Ming-Jiuh Wang, M.D., Ph.D. (Coll. of Med. National Taiwan, 1985, 1996).

Emeriti: Edmond C. Bloch, M.B., Ch.B.; Elisabeth J. Fox, M.B., B.S.; Merel H. Harmel, M.D.; Joannes H. Karis, M.D.; Lloyd F. Redick, M.D.

Basic Science Electives

ANE-243B. Basic Science of Anesthesiology and Environmental Physiology. The Basic Science of Anesthesiology and Environmental Physiology (AEP) is an overview course, primarily intended for third year medical students enrolled in the AEP study track. The purpose is to present information about the specific topic or investigation identified by the lecture title, and to learn about research methods and data analysis. The areas covered in this course are: molecular pharmacology, neurosciences, oxygen toxicity, respiratory and environmental physiology, and statistics and information. Weight: 3 Max: 15 Min: 1. *King, Moon, Stolp, and Warner*

ANE-244B. Tutorial in Research Methods. The Tutorial in Research Methods (Work in Progress) builds on concepts presented in The Basic Science of Anesthesiology and Environmental Physiology. Seminars focuses on the development of scientific information using students' third year projects as examples. Emphasis is placed on experimental design and statistical analysis. Other pertinent topics such as ethical issues are included. Weight: 1 Max: 15 Min: 1 *King, Moon, Stolp, and Warner*

Clinical Science Electives

ANE-215C. Advanced Cardiac Life Support (ACLS). The ACLS Provider course follows the American Heart Association (AHA) guidelines. This course consists of four one-hour lectures, eight hours of skill stations and case-based teaching, and four hours of evaluation. The course is offered February 23-27, 1998. Instruction is scheduled over four days, in the afternoon. Prerequisite: Current Basic Life Support Certification (CPR). Weight: 1 Min: 10 Max: 50. *K. King and staff*

ANE-240C. Clinical Anesthesiology. This course is designed to directly expose students to the clinical practice of anesthesiology. Throughout the rotation, each student is assigned on a weekly basis to an individual resident or attending physician who supervises the student's active participation in the pre-, intra-, and post-operative anesthetic care and management of patients. Opportunities exist for students to participate in the various subspecialty areas of anesthesiology including pediatric, obstetric, cardiac, and neurosurgical anesthesia as well as the recovery room, ICU, and pain clinic. While initial assignments are made prior to the first day of the rotation, there is flexibility with regard to students' particular areas of interest. The evaluation of patients pre-operatively is taught with emphasis placed upon formulating a plan of anesthetic management which is appropriate for the individual patient. The consequential impact of anesthetics and surgical procedures upon particular disease states is also stressed. Students review the clinical pharmacology of anesthetic and adjuvant drugs as well as apply the principles of pharmacology, physiology, and anatomy to the clinical anesthetic management of patients.

Didactic information regarding principles of airway management including endotracheal intubation is presented and reinforced with application in the clinical setting. Participants are exposed to basic methods of administering anesthetics and monitoring the depth of anesthesia through physiologic responses of the patient. Instruction in the appropriate techniques and complications of obtaining vascular access for administering drugs and monitoring hemodynamic status is provided. In addition to this clinical work, students are given the opportunity to attend various lectures including an introductory series (covering preoperative assessment, airway management, and anesthesia equipment), grand rounds and resident lecture series, and various subspecialty conferences (cardiac, pediatrics). No drops or adds are accepted during the week before the course begins. Students wishing to drop or add two weeks prior to the start of the course must contact the course director, Amy Beth Hilton, M.D., beeper #6890. The course is offered August to December, January, March, May. Weight: 4 Max: 6. *A. B. Hilton and staff*

ANE-241C. Surgical Intensive Care. This course is designed to broaden the student's knowledge and experience in dealing with critically ill patients. Under supervision, students function as sub-interns in the Surgical Intensive Care Unit (SICU). Students re assigned their own patients and actively participate in daily rounds as part of the SICU team. There is a morning lecture on aspects of critical care each day. Students take call one night in four and work on a one-on-one basis with SICU house staff in the supervised management of critically ill patients. Two weeks are spent in the SICU at Duke University Medical Center (trauma, vascular surgery, liver-kidney-pancreas transplantation, general surgery) and two weeks in the SICU at the Durham VA Medical Center (cardiothoracic and vascular surgery, general surgery). There is emphasis on teaching of procedures and techniques necessary for the management of all critically ill patients including hemodynamic assessment and monitoring, cardiovascular resuscitation and use of vasoactive drugs, ventilator management including ARDS, prevention and management of nosocomial infections, and nutritional support. Students are formally evaluated by the SICU house staff and the attending physician. C-L: SUR 241C. Weight: 5 Max: 8. *Sladen, Reed, and staff*

ANE-242C. Anesthesiology Research. Selected students participate actively in assigned research projects. These well-focused segments of ongoing work in the Department of Anesthesiology are designed to provide an intensive exposure to the process of new investigation in applied pharmacology and physiology. Most students are based in the Anesthesiology Research Laboratories and are strongly oriented toward personal involvement in the clinical research settings in the Duke Medical Center operating rooms, obstetrical delivery areas, post-operative and intensive care units, the Hyperbaric Laboratories, the pain clinic, or the Clinic Research Unit. An important goal of this experience consists of guiding the student to take conceptual information and to change it into concrete scientific presentation and publication. This course is designed primarily for the student who wishes to consider seriously a career in academic anesthesiology. Weight: 4-8 Max: 2. *Glass and staff*

Biochemistry

George Barth Geller Professor Christian R. H. Raetz, M.D., Ph.D. (Harvard, 1973), *Chairman*.

Professors: G. Vann Bennett, M.D., Ph.D. (Johns Hopkins, 1976); Perry J. Blackshear, M.D. (Harvard, 1977); James B. Duke Professor Irwin Fridovich, Ph.D. (Duke, 1955); Arno L. Greenleaf, Ph.D. (Harvard, 1974); Gordon G. Hammes, Ph.D. (Wisconsin, 1959); James B. Duke Professor Robert L. Hill, Ph.D. (Kansas, 1954); Tao-Shih Hsieh, Ph.D. (California-Berkeley, 1976); Nicholas M. Kredich, M.D. (Michigan, 1962); James B. Duke Professor Robert J. Lefkowitz, M.D. (Columbia, 1966); James B. Duke Professor Paul L. Modrich, Ph.D. (Stanford, 1973); James B. Duke Professor K. V. Rajagopalan, Ph.D. (Madras, India, 1957); David C. Richardson, Ph.D. (Massachusetts Inst. Tech., 1967); James B. Duke Professor Jane S. Richardson, M.S., M.S.T. (Harvard, 1966); Lewis M. Siegel, Ph.D. (Johns Hopkins, 1965); Leonard D. Spicer, Ph.D. (Yale, 1968); Deborah A. Steege, Ph.D. (Yale, 1974); Robert E. Webster, Ph.D. (Duke, 1965).

Associate Professors: Michael D. Been, Ph.D. (Washington, 1982); Patrick Casey, Ph.D. (Brandeis, 1986); Carol A. Fierke, Ph.D. (Brandeis, 1984); Ronald C. Greene, Ph.D. (California Inst. Tech., 1954); Bernard Kaufman, Ph.D. (Indiana, 1961); Russel E. Kaufman, M.D. (Ohio State, 1973); Harvey J. Sage, Ph.D. (Yale, 1958); Eric Toone, Ph.D. (Toronto, 1988).

Assistant Professors: Lorena S. Beese, Ph.D. (Brandeis, 1984); Stephen Garrett, Ph.D. (Johns Hopkins, 1986); Homme W. Hellinga, Ph.D. (Cambridge, 1986); Michael S. Hershfield, M.D. (Pennsylvania, 1967); Terrence Oas, Ph.D. (Oregon, 1986); Sheldon R. Pinnell, M.D. (Yale, 1963).

Assistant Research Professor: Jean L. Johnson, Ph.D. (Duke, 1974).

Adjunct Assistant Professor: Per-Otto Hagen, F.H.W.C. (Watt Univ., Scotland, 1961).

Research Associates: Dwayne Allen, Ph.D.; Pawan Bali, Ph.D.; Shib Basu, Ph.D.; Ines Batinic-Haberle, Ph.D.; Wendy Bedale, Ph.D.; Ludmil Benov, Ph.D.; Leonard Blackwell, Ph.D.; Dawn Chandrasekhar, Ph.D.; Eva Marie Click, Ph.D.; Karen Conklin, Ph.D.; Vivian Dao, Ph.D.; Garry Dotson, Ph.D.; Jim Drummond, Ph.D.; Derek Duckett, Ph.D.; Allen E. Eckhardt, Ph.D.; Robert Garrett, Ph.D.; Jochen Genschel, Ph.D.; Jim Hilton, Ph.D.; Barbara Hindenach, Ph.D.; Jennifer Hunt, Ph.D.; Thomas Kirby, Ph.D.; Thomas Labean, Ph.D.; Jae Lee, Ph.D.; Stefan I. Liotchev, Ph.D.; Susan Littman, Ph.D.; Wentian Liu, Ph.D.; Joseph Mack, Ph.D.; Chen Mao, Ph.D.; Daniel Morris, Ph.D.; Somashe Niranjana, Ph.D.; Hee-Won Park, Ph.D.; Juan Perez-Vilar, Ph.D.; Andrew Pierce, Ph.D.; Anthony Ribeiro, Ph.D.; Gregory Runyon, Ph.D.; Wen-Ling Shaiu, Ph.D.; Gong Shen, Ph.D.; Hope Taylor, Ph.D.; Ronald A. Venters, Ph.D.; David Volk, Ph.D.; Hai Vu, Ph.D.; Kim White, Ph.D.; Gene Wickham, Ph.D.; Margot Wuebbens, Ph.D.; Zhimin Zhou, Ph.D.

Emeriti: Mary L. C. Bernheim, Ph.D.; Samson R. Gross, Ph.D.; Walter R. Guild, Ph.D.; Jerome S. Harris, M.D.; Kenneth S. McCarty, Sr., Ph.D.; Yashiko Nozaki, Ph.D.; Robert W. Wheat, Ph.D.

Required Course

BCH-200B. Biochemistry. The core course given to all freshman medical students during a period of seven weeks in the first term emphasizes the relationship between structure and function of the major classes of macromolecules in living systems including proteins, carbohydrates, lipids, and nucleic acids. The metabolic interrelationships and control mechanisms are discussed as well as the biochemical basis of human diseases. Weight: 4. *Raetz*

Electives

BCH-215B. Molecular Genetics I: Genetic Mechanisms. A comprehensive treatment of molecular and classical genetic mechanisms, emphasizing gene structure and function, genetic analysis gene in various experimental systems, as well as the behavior of chromosomes in replication, segregation, and recombination. C-L: Graduate School. Weight: 3. *Nevins and staff*

BCH-357B. Research in Biochemistry. In a limited number of cases, a student is permitted to participate in the research program of a faculty member. Acceptance is by individual arrangement with the proposed faculty preceptor. Weight: 1-16. *Staff*

BCH-358B. Research in Biochemistry. A student may obtain first hand research experience by participating in the research program of a faculty member. Acceptance is by individual arrangement with the proposed faculty preceptor. Weight: 1-16. *Staff*

BCH-417B. Membranes, Receptors, and Cellular Signaling. Basic and current concepts of the biological membranes, membrane proteins and organization; mechanism of action of hormones at the cellular level including hormone-receptor interactions, secondary messenger systems for hormones, mechanism of regulation of hormone responsiveness, regulation of growth, differentiation and proliferation, cellular electrophysiological mechanisms of transport and ions channels, secretory and sensory stimulus sensing and transduction. Some lectures stress the clinical correlation of the basic concepts in the course. C-L: CBI-417B; Graduate School. Weight: 3. *Caron, Webster, Bell, and invited lecturers*

Biological Anthropology and Anatomy

Professor: Richard F. Kay, Ph.D. (Yale, 1973), *Chairman*.

Professors: Matthew Cartmill, Ph.D. (Chicago, 1970); Kenneth Glander, Ph.D. (Chicago, 1975); William L. Hylander, D.D.S. (Illinois, 1963), Ph.D. (Chicago, 1972); James B. Duke Professor Elwyn L.

Simons, Ph.D. (Princeton, 1956), D. Phil. (Oxford, 1959); John Terborgh, Ph.D. (Harvard, 1963); Carel van Schaik, Ph.D. (Utrecht, 1985).

Associate Professors: V. Louise Roth, Ph.D. (Yale, 1982); Kathleen K. Smith, Ph.D. (Harvard, 1980).

Assistant Professors: Frank H. Bassett III, M.D. (Louisville, 1957); Steven Churchill, Ph.D. (New Mexico, 1994); Mary C. Maas, Ph.D. (SUNY-Stony Brook, 1988); Theresa R. Pope, Ph.D. (Florida, 1989); Frances J. White, Ph.D. (SUNY-Stony Brook, 1986).

Adjunct Research Professors: Diane K. Brockman, Ph.D. (Yale, 1994); Leslie J. Digby, Ph.D. (California-Davis, 1994); Mark Spencer, M.D. (SUNY-Stony Brook, 1995).

Adjunct Professor: Clark Larsen, Ph.D. (Michigan, 1980).

Adjunct Associate Professor: Patricia C. Wright, Ph.D. (City Univ. of New York, 1985).

Adjunct Assistant Professors: Thomas Anderson, Ph.D. (Duke, 1971); Deborah Overdorff, Ph.D. (Duke, 1991).

Research Associates: Friderun Ankel-Simons, Ph.D. (Copenhagen, 1963); Marianne Bouvier, Ph.D. (Duke, 1982); Mark Hamrick, Ph.D. (Northwestern, 1995); Rick Madden, Ph.D. (Duke, 1990); Daniel Schmitt, Ph.D. (SUNY-Stony Brook); Christine Wall, Ph.D. (SUNY-Stony Brook, 1995); Blythe A. Williams, Ph.D. (Colorado, 1994).

Research Scientists: Susan Crissy, Ph.D. (Maryland, 1985); Lillian Spencer, Ph.D. (SUNY-Stony Brook, 1995); Thomas Struhsaker, Ph.D. (California-Berkeley, 1965).

Instructor: Kirk Johnson, M.A. (Duke, 1981).

Lecturing Fellow: Prithijit Chatrath, B.S. (Punjab Univ., 1964).

Emeritus: Kenneth L. Duke, Ph.D. (Duke, 1940).

Required Course

BAA-200B. Gross Human Anatomy. First-year medical students are required to take gross anatomy. Includes complete dissection of a cadaver; laboratory work is supplemented by conferences which place emphasis upon biological and evolutionary aspects. Weight: 4. *Cartmill*

Electives

BAA-214B. Anatomy of the Head and Neck. This course is designed to be a review of the head and neck, emphasizing its phylogenetic and ontogenetic development along with clinically important features of the anatomy of this region. Weight: 2 Min: 5 Max: 12. *K. Smith and staff*

BAA-221B. Anatomy of the Trunk. Emphasis is on the anatomy of the thoracic, abdominal, and pelvic organs including relationships, blood supply, and innervations and, where practical, developmental and microscopic anatomy. The dissections are supplemented with audiovisual presentations and discussions with such prosections as are available. Weight: 2 Min: 8 Max: 20. *Staff*

BAA-224B. Tutorial in Gross Anatomy. A detailed review of selected regions of the human body in the context of the "core" gross anatomy sequence. The student plans prosections, special presentations, etc., with staff. The student also elects to study one or more selected regions in consultation with staff. Weight: 1-5 Min: 1 Max: 5. *Hylander and staff*

BAA-231B. Anatomy of Back and Extremities. The course includes complete dissection of back and extremities including pectoral and pelvic girdles. Visual aids are used extensively. Course planned for orthopaedics, general practice, or neurosurgery. Weight: 3 Min: 6 Max: 20. *Bassett and staff*

Cell Biology

George Barth Geller Professor for Research in Molecular Biology Michael P. Sheetz, Ph.D. (California Inst. Tech., 1972), *Chairman*.

Associate Professor Daniel P. Kiehart, Ph.D. (Pennsylvania, 1979), *Chief, Division of Developmental Biology*.

Professor Lazaro J. Mandel, Ph.D. (Pennsylvania, 1969); *Chief, Division of Physiology and Cellular Biophysics*.

Professors: G. Vann Bennett, M.D. (Johns Hopkins, 1976); James B. Duke Professor J. Joseph Blum, Ph.D. (Chicago, 1952); Celia Bonaventura, Ph.D. (Texas-Austin, 1968); Joseph Bonaventura, Ph.D. (Texas-Austin, 1968); Marc G. Caron, Ph.D. (Miami, 1973); Harold P. Erickson, Ph.D. (Johns Hopkins, 1969); Diane L. Hatchell, Ph.D. (Marquette, 1968); Melvyn Lieberman, Ph.D. (SUNY, 1964); Thomas J. McIntosh, Ph.D. (Carnegie Mellon, 1973); Thomas J. McManus, M.D. (Boston, 1955); R. Bruce Nicklas, Ph.D. (Columbia, 1958); George M. Padilla, Ph.D. (California-Los Angeles, 1960); Michael K. Reedy, M.D. (Washington, 1962); George G. Somjen, M.D. (New Zealand, 1961).

Associate Professors: Onyekwere E. Akwari, M.D. (Southern California, 1970); Nels C. Anderson, Ph.D. (Purdue, 1964); Frederick R. Cobb, M.D. (Mississippi, 1964); Joseph M. Corless, M.D., Ph.D. (Duke, 1972); Joseph C. Greenfield, M.D. (Emory, 1956); Yusuf A. Hannun, M.D. (American Univ. Beirut, 1981); Elliott Mills, Ph.D. (Columbia, 1964); Frederick H. Schachat, Ph.D. (Stanford, 1974); David W. Schomberg, Ph.D. (Purdue, 1965); Steven R. Vigna, Ph.D. (Washington, 1978); Jo Rae Wright, Ph.D. (West Virginia, 1981).

Assistant Professors: Page A. W. Anderson, M.D. (Duke, 1963); Bruce A. Benjamin, Ph.D. (Oklahoma, 1980); Blanche Capel, Ph.D. (Pennsylvania, 1989); Jonathan Cohn, M.D. (Rockefeller, 1978); Laura I. Davis, Ph.D. (Rockefeller, 1987); Arturo De Lozanne, Ph.D. (Stanford, 1988); Marc K. Dreznier, M.D. (Pittsburgh, 1970); Richard G. Fehon, Ph.D. (Washington, 1986); Rodney J. Folz, M.D. (Washington Univ., 1989); William E. Garrett, Jr., M.D., Ph.D. (Duke, 1976); James M. Grichnik, M.D., Ph.D. (Harvard, 1990); James D. Iglehart, M.D. (Harvard, 1975); William E. Kraus, M.D. (Duke, 1982); Virginia Ann Lightner, M.D., Ph.D. (Duke, 1982); Haifan Lin, Ph.D. (Cornell, 1990); Tobias Meyer, Ph.D. (Basel, 1986); Christopher V. Nicchitta, Ph.D. (Pennsylvania, 1987); Lina M. Obeid, M.D. (Beirut, 1983); Theresa O'Halloran, Ph.D. (North Carolina, 1986); Patricia M. Saling, Ph.D. (Pennsylvania, 1979); Sean P. Scully, M.D. (Rochester, 1986); Robert N. Sladen, M.B., Ch.B. (Cape Town, South Africa, 1970), M.R.C.P. (Royal Postgrad. Med. Sch., 1973); Jonathan S. Stamler, M.D. (Mt. Sinai, 1985); Bryant W. Stolp, M.D. (North Carolina, 1988), Ph.D. (Duke, 1985); Katherine I. Swenson, Ph.D. (Washington, 1983); Margaret A. Titus, Ph.D. (Brandeis, 1987); Timothy J. Webb, M.D., Ph.D. (Texas-San Antonio, 1980, 1974); William E. Yarger, M.D. (Baylor, 1971).

Associate Research Professors: Peter G. Aitken, Ph.D. (Connecticut, 1978); E. Ann LeFurgey, Ph.D. (North Carolina, 1976).

Assistant Research Professors: Ling-Yi Chang, Ph.D. (North Carolina State, 1982); R. Brian Doctor, Ph.D. (Duke, 1992); Bruce M. Klitzman, Ph.D. (Virginia, 1979); Jae Moon Lee, Ph.D. (Duke, 1989); Bruce Lobaugh, Ph.D. (Pennsylvania State, 1981); E. Timothy O'Brien, Ph.D. (California-Santa Barbara, 1986); Emmanuel C. Opara, Ph.D. (London, 1984).

Adjunct Professor: Martin Rodbell, Ph.D. (Washington, 1954).

Adjunct Associate Professors: Charles R. Horres, Jr., Ph.D. (Duke, 1975); James M. Schooler, Jr., Ph.D. (Wisconsin, 1964).

Adjunct Assistant Professors: Leslie A. Lobaugh, Ph.D. (Duke, 1986); Elizabeth Murphy, Ph.D. (Pennsylvania, 1980); R. Neal Shepherd, Ph.D. (Duke, 1975).

Emeriti: Sheila J. Counce, Ph.D.; Frans F. Jöbsis, Ph.D.; Edward A. Johnson, M.D.; Montrose J. Moses, Ph.D.; Jacqueline A. Reynolds, Ph.D.; Knut Schmidt-Nielsen, Dr.Phil.; Joachim R. W. Sommer, M.D.

Required Courses

CBI-200B. Cell Biology. Lectures on the structure and function of the cells and tissues of the body. The laboratory provides practical experience with light microscopy studying and analyzing the extensive slide collection of mammalian tissues. Weight: 2. *McIntosh and staff*

CBI-201B. Microanatomy. Lectures on the structural organization of the organs of the body, as determined by light and electron microscopy, with emphasis on the relation of structure to function at the cellular level. Laboratory sessions are used to study histological preparations of mammalian tissues. Weight: 2. *McIntosh and staff*

CBI-202B. Medical Physiology. Ph.D. Lectures and conferences on cell and organ physiology. Human and medical aspects are stressed in clinical conferences. Lectures, conferences, and computer-based laboratory exercises. Weight: 4. *N. Anderson and staff*

Electives

CBI-211B. Cellular Mechanisms of Injury. Selected topics in mechanisms of injury at the cellular and molecular levels chosen for reading and discussion in a combined lecture/seminar format. Subject matter varies each semester; can be taken more than

once. Prerequisite: consent of instructor. Offered Spring term only. C-L: Graduate School. Weight: 2 Min: 5 Max: 10. *LeFurgey, Mandel, and guest faculty*

CBI-212B. The Cell and Molecular Biology of Reproduction. During the last decade, cell, molecular, and neurobiological investigations have dramatically advanced our understanding of reproduction. In this course, we aim to focus on these recent findings to present an integrated view of the reproductive process in males and females. The general areas to be covered include neuroendocrinology, reproductive endocrinology, gametogenesis, and fertilization, although recent studies in areas such as gene regulation; intercellular communication; hormones, growth factors and signaling; and early development and differentiation are emphasized. C-L: Graduate School. Weight: 3 Min: 6 Max: 20. *Saling and Schomberg*

CBI-219B. Preceptorship in Cell Biology/Physiology. Guided independent study of original literature and/or research experience in cell biology and/or physiology. Prerequisites: consent of instructor and departmental director of medical studies. Weight: 1-16. *Padilla and staff*

CBI-237B. Analytical Imaging in Biomedical Research. Weekly seminars to discuss concepts and techniques in high resolution analytical imaging of cells and subcellular organelles and to review application of these concepts to structural-functional correlations in cell physiology and pathophysiology. Offered Spring term only. C-L: Graduate School. Weight: 3 Min: 5 Max: 10. *LeFurgey, Ingram, and Kopf*

CBI-251B. Molecular Cell Biology. Current research topics in cell biology presented in a lecture and discussion format based on recent research papers. Topics include: protein secretion and trafficking; mitochondria and organelles; the nucleus; cytoskeleton and cell motility; extracellular matrix and cell adhesion; growth factors and signaling; cell cycle. Weight: 1. *Erickson and staff*

CBI-269B. Advanced Cell Biology. Structural and functional organization of cells and their components with emphasis on current research problems and prospects. C-L: MIC-269B; Graduate School. Weight: 3. *Siedow and staff*

CBI-340B. Tutorial in Cell Biology/Physiology. Selected topics are chosen for intensive reading and discussion. Topics may be chosen relating to basic problems of cytology, growth and development, biophysics, endocrinological control, neuroanatomy, physiological differentiation, and evolutionary origins of functional microsystems. Prerequisites: permission of faculty preceptor. C-L: Graduate School. Weight: 1-3 Max: 8. *Staff*

CBI-417B. Cellular Signaling. Basic and current concepts of biological membranes, membrane proteins and organization; mechanism of action of hormones at the cellular level including hormone-receptor interactions, secondary messenger systems for hormones, mechanisms of regulation of hormone responsiveness, regulation of growth, differentiation and proliferation, cellular electrophysiological mechanisms of transport and ion channels, secretory and sensory stimulus sensing and transduction. Some lectures stress the clinical correlation of the basic concepts elaborated in the course. C-L: BCH-417B; Graduate School. Weight: 3 Max: 12. *Caron and invited lecturers*

Community and Family Medicine

Clinical Professor: James L. Michener, M.D. (Harvard, 1978), *Chairman*.

Professor: Barbara K. Rimer, Dr. P.H. (Johns Hopkins, 1981).

Assistant Professor: Joellen Schildkraut, Ph.D. (Yale, 1987).

Associate Professor: Colleen McBride, Ph.D. (Minnesota, 1990).

DIVISION OF BIOMETRY

Associate Professor: William E. Wilkinson, Ph.D. (North Carolina, 1968), *Chief*.

Professors: J. P. Gibbons Professor Daniel G. Blazer II, M.D. (Tennessee, 1969), Ph.D. (North Carolina, 1980); Stephen L. George, Ph.D. (Southern Methodist, 1969).

Associate Professors: John R. Feussner, M.D. (Vermont, 1973); Kerry L. Lee, Ph.D. (North Carolina, 1974); Gary L. Rosner, Sc.D. (Harvard, 1985).

Assistant Professors: David M. DeLong, Ph.D. (North Carolina, 1977); Elizabeth R. DeLong, Ph.D. (North Carolina, 1979); James E. Herndon II, Ph.D. (North Carolina, 1988); Bercedis L. Peterson, Ph.D. (North Carolina, 1986); Carl F. Pieper, Dr.P.H. (Columbia, 1990); Gregory P. Samsa, Ph.D. (North Carolina, 1988).

Research Professor: Kenneth G. Manton, Ph.D. (Duke, 1974).

Assistant Research Professors: Maragatha Kuchibhatla, Ph.D. (Texas A&M, 1992); Lauren M. McIntyre, Ph.D. (North Carolina State, 1996); Lawrence H. Muhlbauer, Ph.D. (North Carolina, 1981); Sandra Stinnett, Dr.P.H. (North Carolina, 1993).

DIVISION OF MEDICAL INFORMATION SCIENCES

Professor: William E. Hammond, Ph.D. (Duke, 1967), *Chief*.

Associate Research Professor: W. Deanes Bidgood, Jr., M.D. (Florida, 1977), M.S. (North Carolina, 1995).

Assistant Research Professors: Joseph W. Hales, Ph.D. (Utah, 1991); David Lobach, M.D., Ph.D. (Duke, 1987, 1986), M.S. (Duke, 1994).

Research Associates: James D. Collins, Ph.D. (Duke, 1982); Roland Gettliffe, Ph.D. (Duke, 1989).

FAMILY MEDICINE PROGRAM

Assistant Clinical Professor Hershey S. Bell, M.D. (Toronto, 1982), *Vice Chair*.

Professors: George R. Parkerson, Jr., M.D. (Duke, 1953), M.P.H. (North Carolina, 1977); Harmon L. Smith, Ph.D. (Duke, 1962).

Associate Professors: Barrie J. Hurwitz, M.B. (Witwatersrand, 1968); Joseph Lipscomb, Jr., Ph.D. (North Carolina, 1975); Robert J. Sullivan, Jr., M.D. (Cornell, 1966), M.P.H. (North Carolina, 1973).

Associate Clinical Professors: William Christmas, M.D. (Boston, 1965); Kathryn A. Andolsek, M.D. (Northwestern, 1975).

Assistant Professors: Linda S. Lee, Ph.D. (North Carolina, 1991); Jonathan L. Sheline, M.D. (North Carolina, 1984), M.P.H. (Harvard, 1978); Deborah L. Squire, M.D. (Northwestern, 1978).

Assistant Clinical Professors: Melvin Berlin, M.D. (Duke, 1953); Joyce A. Copeland, M.D. (North Carolina, 1975); Margaret Gradison, M.D. (Cincinnati, 1981); Victoria K. Johnson, M.D. (California-Los Angeles, 1985); Mary Lee Lobach, M.D. (Vanderbilt, 1984); Albert A. Meyer, M.D. (SUNY-Brooklyn, 1975); Elizabeth Nadler, M.D. (New York Univ., 1985); Richard K. Serra, M.D. (Michigan, 1977); Barbara L. Sheline, M.D., M.P.H. (North Carolina, 1984); Kimberly S. Yarnall, M.D. (Florida, 1985).

Assistant Research Professor: Veronica M. Hegarty, M.B., M.R.C.P.I. (Dublin, 1984).

Clinical Associates: Lauracinnie D. Jenkins, M.D. (SUNY-Buffalo, 1982); Janet Lehr, M.D. (Florida, 1982); William Gunn, Ph.D. (Virginia Polytechnic, 1986); Amrit Singh, M.D. (West Virginia, 1990); Roy Stein, M.D. (Duke, 1980); Katherine Robinson, M.D. (North Carolina, 1989); Karen Weaver, M.D. (Michigan, 1993).

Clinical Instructor: Joseph W. Kertesz, Jr., M.A. (Michigan, 1973).

Associate: Catherine M. Severns, R.N.P. (Yale, 1971).

Research Associate: William T. Vaughan, R.Ph., R.P.A. (North Carolina, 1972).

DIVISION OF OCCUPATIONAL AND ENVIRONMENTAL MEDICINE

Assistant Clinical Professor: Gary N. Greenberg, M.D. (Northwestern, 1978), M.P.H. (North Carolina, 1983), *Division Chief*.

Professor: David G. Warren, J.D. (Duke, 1964).

Associate Professor: John Dement, Ph.D. (North Carolina, 1980).

Associate Clinical Professors: George W. Jackson, M.D. (Western Reserve, 1968); Jerry J. Tulis, Ph.D. (Catholic Univ., 1965).

Assistant Professor: Samuel D. Moon, M.D. (Virginia, 1975), M.P.H. (North Carolina, 1991).

Assistant Clinical Professors: Carol Epling, M.D. (Virginia, 1989), M.S.P.H. (Colorado, 1994); Craig R. Stenberg, Ph.D. (Denver, 1982); Woodhall Stopford, M.D. (Harvard, 1969), M.S.P.H. (North Carolina at Chapel Hill, 1980); Edward D. Thalmann, M.D. (Georgetown, 1970); Wayne R. Thomann, Dr.P.H. (North Carolina at Chapel Hill, 1983).

Assistant Research Professor: Hester J. Lipscomb, Ph.D. (North Carolina, 1995).

Associates: Thomas O. Brock, III, Ph.D. (Wake Forest, 1980); Dennis Darcey, M.D., M.S.P.H. (North Carolina, 1986, 1988).

Clinical Associates: Judith Holder, Ph.D. (Southern Illinois, 1995); Debra Hunt, Dr.P.H. (North Carolina, 1984); Debra Moorman, M.D. (USUHS, 1984); David P. Siebens, M.D. (Washington, 1983);

Andrew S. Silberman, M.S.W. (North Carolina, 1982); Deborah Smith, M.S.W. (North Carolina, 1979); Camille Warren, M.D. (North Carolina, 1980).

Research Associate: James M. Schmidt, B.H.S. (Duke, 1974).

DIVISION OF PHYSICIAN ASSISTANT EDUCATION

Associate Clinical Professor: Reginald D. Carter, Ph.D. (Bowman Gray, 1970), *Chief*.

Assistant Clinical Professor: Joyce A. Copeland, M.D. (North Carolina, 1975), *Medical Director*.

Assistant Clinical Professors: Lovest T. Alexander, M.H.S. (Duke, 1991); Patricia A. Dieter, M.P.A. (Pennsylvania State, 1983); Phillip Price, M.H.S. (Duke, 1991); Jan Victoria Scott, M.H.S. (Duke, 1991).

Clinical Associates: Robert Giggey, PA-C (Maine Medical Center, 1991); Paul C. Hendrix, M.H.S. (Duke, 1991); Gloria Jordan, PA-C (Duke, 1988); John C. Lord, PA-C (Duke, 1981).

DUKE DIET AND FITNESS CENTER

Assistant Clinical Professor: Michael A. Hamilton, M.D. (Rochester, 1964), M.P.H. (North Carolina, 1969), *Chief*.

Assistant Clinical Professors: Susan Head, Ph.D. (Louisiana State, 1991); Ronette L. Kolotkin, Ph.D. (Minnesota, 1978).

Assistant Research Professor: Spencer A. Brown, Ph.D. (Pennsylvania, 1984).

Clinical Associate: Lisa Giannetto, M.D. (Loyola, 1986).

ADJUNCT FACULTY

Adjunct Professor: Barbara S. Hulka, M.D. (Columbia, 1959), M.P.H. (Columbia, 1961).

Adjunct Associate Professors: Mark R. Conaway, Ph.D. (Minnesota, 1985); James F. Gifford, Jr., Ph.D. (Duke, 1969); Frank E. Harrell, Jr., Ph.D. (North Carolina, 1979).

Adjunct Associate: Susan Lief, Ph.D. (North Carolina, 1996).

Adjunct Assistant Professors: James D. Bernstein, M.H.A. (Michigan, 1968); Brian A. Boehlecke, M.D. (SUNY-Buffalo, 1970), M.P.H. (North Carolina, 1981); Patricia M. Eiff, M.D. (Med. Coll. Wisconsin, 1983); Lars C. Larsen, M.D. (SUNY-Syracuse, 1973); Gina R. Petroni, Ph.D. (Michigan, 1990); Clare J. Sanchez, M.D. (Colorado School of Med., 1975); Bonnie Yankaskas, Ph.D. (North Carolina, 1982), M.P.H. (Yale, 1973).

COMMUNITY FACULTY

Associate Clinical Professor: Charles Ellenbogen, M.D. (Chicago-Pritzker, 1964), Fayetteville, NC.

Assistant Clinical Professors: L. Allen Dobson, Jr., M.D. (Bowman Gray, 1980), Mt. Pleasant, NC; James A. Mergy, M.D. (California, 1987), Fayetteville, NC; Oliver N. Oyama, Ph.D. (Indiana, 1985), Fayetteville, NC; James M. Wetter, M.D. (SUNY-Buffalo, 1974), Fayetteville, NC.

Clinical Associates: Gloria Jordan, PA-C (Duke, 1988); James A. Mergy, M.D. (California, 1987), Fayetteville, NC; Lenard Salzberg, M.D. (Albany, 1988).

Consulting Professor: Barrie Cassileth, Ph.D. (Pennsylvania, 1978), Chapel Hill, NC; Donald M. Hayes, M.D. (Bowman Gray, 1954), Greensboro, NC; Roger O. McClellan, D.V.M. (Washington State, 1960).

Associate Consulting Professors: W. Eugene Broadhead, M.D. (Duke, 1981), Ph.D. (North Carolina, 1987), Danville, VA; Joan Cornoni-Huntley, Ph.D. (North Carolina, 1970), Chapel Hill, NC; Linda Frazier, M.D. (Mount Sinai, 1980), M.P.H. (North Carolina, 1992); Kathryn Magruder-Habib, Ph.D. (North Carolina, 1987), Washington, D.C.; Sigrid J. Nelius, M.D. (Ludwig Maximilian, Germany, 1949), Durham, NC; Katharine M. Simon, Ph.D. (Iowa, 1979), St. Louis, MO; Samuel W. Warburton, Jr., M.D. (Pennsylvania, 1969).

Assistant Consulting Professors: Anne M. Akwari, M.D. (Howard, 1976); Powell Anderson, M.D. (Duke, 1949), Waynesboro, VA.; Evan A. Ballard, M.D. (Duke, 1976), Jonesville, NC; Daniel H. Barco, M.D. (Duke, 1972), Durham, NC; James E. Barham, M.D. (Duke, 1974), Anderson, SC; James S. Blair, Jr., M.D. (Maryland, 1947), Wallace, NC; Don W. Bradley, M.D. (Med. Coll. Virginia, 1976), Durham, NC; Susan E. Brown, M.D. (Georgetown, 1976), Durham, NC; Jack R. Cahn, M.D. (Penn. State-Hershey, 1972), Sparta, NC; Jane T. Carswell, M.D. (Med. Coll. Virginia, 1958), Lenoir, NC; John W. Cromer, Jr., M.D. (Nebraska, 1972), M.S.P.H. (North Carolina, 1980), Wilmington, NC; Bruce A. Dalton, Jr., M.D. (North Carolina, 1969), Research Triangle Park, NC; Charles Davant III, M.D. (North Carolina, 1972), Blowing Rock, NC; John D. Davis, Jr., M.D. (North Carolina, 1978), Blowing Rock, NC; Clyde J. Dellinger, M.D. (Duke, 1961), Drexel, NC; Howard Eisonson, M.D. (Duke, 1979), Durham, N.C.; Curtis J. Eshelman, M.D. (Michigan, 1971), Durham, NC; Lawrence L. Fleenor, Jr., M.D. (Virginia, 1966), Big Stone Gap, VA; Henry A. Fleishman, M.D. (Emory, 1974); Raymond A. Gaskins, Jr., M.D. (North Carolina, 1975), Fayetteville, NC; E. Albino Gomez-Uria, M.D. (Madrid Sch. Med., 1962), Asheville, NC; Wilson Griffin III, M.D. (Duke, 1977), Jonesville, NC; James K. Hartye, M.D. (Vanderbilt, 1977), North Wilkesboro, NC; Paul O. Howard, M.D. (Virginia, 1955), Sanford, NC; Peter Jacobi, M.D. (Western Reserve, 1979), Durham, NC; Lane E. Jennings, M.D. (Miami, 1975), Port

Orange, FL; Pamela H. Jessup, M.D. (Bowman Gray, 1977), Sanford, NC; Eric M. Johnsen, M.D. (Wayne State, 1977), Albermarle, NC; Lyndon K. Jordan, M.D. (Duke, 1965), Smithfield, NC; Charles W. Lapp, M.D. (Albany Med. Coll., 1974), Raleigh, NC; Walter L. Larimore, M.D. (Louisiana, 1977), Bryson City, NC; Rodney L. Lowman, Ph.D. (Michigan State, 1979), Bel Aire, TX; G. Yancey Mebane, M.D. (Duke 1954), Mebane, NC; Lawrence Myers, Ph.D. (California-Berkeley, 1972), Research Triangle Park, NC; Melvin T. Pinn, Jr., M.D. (Virginia, 1976), Charlotte, NC; Jessica Sax-Schorr, M.D. (Tufts, 1977), Charlotte, NC; Charles P. Scheil, M.D. (Duke, 1958), Lenoir, NC; Evelyn D. Schmidt, M.D. (Duke 1951), M.P.H. (Columbia, 1962), Durham, NC; Harold D. Schutte, M.D. (Loma Linda, 1962), Asheville, NC; William B. Waddell, M.D. (Duke, 1962), Galax, VA; John W. Watson, M.D. (Med. Coll. Virginia, 1953), Oxford, NC; Abner C. Withers, M.D. (North Carolina, 1962), Morganton, NC; Glenn A. Withrow, M.D. (North Carolina, 1985), Durham, NC.

Consulting Associates: David P. Adams, Ph.D. (Florida, 1987), M.P.H. (Ohio, 1994), Concord, NC; Susan R. Andersen, M.D. (Southern Florida, 1992), Concord, NC; Charles S. Baker, III, M.D. (Duke, 1979), Kannapolis, NC; Clarence H. Beavers, M.D. (West Virginia, 1982), Eden, NC; Brian Bolinger, M.D. (Case Western Reserve, 1991), Fort Bragg, NC; Andrew A. Bonin, M.D. (Duke, 1975), Raleigh, NC; Kevin Broyles, M.D. (Florida, 1986), Chapel Hill, NC; Michael A. Cassaday, D.O. (Coll. Osteopathic Med., 1976), Fort Bragg, NC; Karol C. Cheek, M.D. (South Carolina, 1987), Concord, NC; Young S. Choi, M.D. (Oklahoma, 1985), Fort Bragg, NC; David L. Christopherson, M.D. (Michigan, 1974), Concord, NC; Philip A. Contino, Jr., M.H.S. (Western Carolina, 1994), Franklin, NC; Steven W. Corso, M.D. (South Carolina, 1988), Fort Bragg, NC; Michelle E. Crow, Pharm.D. (Texas, 1993), Durham, NC; R. Joseph Cutler, PA-C (South Carolina, 1974), Kannapolis, NC; Terry G. Daniel, M.D. (West Virginia, 1988), Eden, NC; Mary Carol Digel, M.D. (Duke, 1987), Sparta, NC; Tommy K. Earnhardt, PA-C (Emory, 1984), Mt. Pleasant, NC; Nathan Erteschik, M.D. (George Washington, 1979), Fort Bragg, NC; Cristine V. C. Eudy, F.N.P. (North Carolina, 1994), Concord, NC; Ann K. Freneau, M.D. (George Washington, 1985) Durham, NC; Conrad L. Flick, M.D. (Duke, 1989), Raleigh, NC; Forest D. Garretson, M.D. (Pittsburgh, 1957), Fort Bragg, NC; Lawrence L. Golusinski, M.D. (Med. Coll. Virginia, 1989), Atlanta, GA; Ruppert A. Hawes, M.D. (Ohio State, 1991), Concord, NC; Jackie A. Hayes, M.D. (Mississippi, 1988), Fort Bragg, NC; Jeffrey D. Hoffman, M.D. (North Carolina, 1984), Concord, NC; Kevin P. Howard, M.D. (Wayne State, 1982), Reidsville, NC; Diane C. Hudson, M.D. (Missouri-Columbia, 1987), Newton Grove, NC; Rosemary Jackson, M.D., M.P.H. (North Carolina, 1980, 1989); Durham, North Carolina; Rudolph Jackson, Dr.P.H. (North Carolina, 1980), Durham, NC; Robert A. Joy, M.D. (Vermont, 1991), Fort Bragg, NC; Richard Juberg, M.D. (East Carolina, 1982), Erwin, NC; Kenneth R. Kemp, M.D. (Arkansas, 1988), Fort Bragg, NC; Eugenie M. Komives, M.D. (Harvard, 1985), Durham, NC; Michael R. Kunkel, M.D. (Virginia, 1990), Fort Bragg, NC; William L. Lasswell, M.D. (Brown, 1989), Fort Bragg, NC; Glen R. Liesegang, M.D. (Kentucky, 1983), Blowing Rock, NC; Matthew McCarty, M.D. (Case Western Reserve, 1988), Fort Bragg, NC; James S. McGrath, M.D. (Tulane, 1980), Durham, NC; Robert N. Murray, D.O. (Kirksville Coll. Osteopathic Med., 1984), Fort Bragg, NC; L. David Nave, Jr., M.D. (Bowman Gray, 1981), Sanford, NC; J.T. Newton, M.D. (North Carolina, 1981), Clinton, NC; Sandra J. Newton, M.D. (Wayne State, 1984), Durham, NC; Malcolm H. Pannill, B.H.S. (Bowman Gray, 1988), Fayetteville, NC; Ronald A. Pollack, M.D. (Med. Coll. Virginia, 1986), Charlotte, NC; Gwendolyn Powell, M.D. (Miami, 1981), M.P.H. (North Carolina, 1986), Durham, NC; John A. Powell, M.D. (USUHS, 1987), Fort Bragg, NC; James W. Y. Quan, M.D. (Tufts, 1984), Fort Bragg, NC; Michael A. Rave, M.D. (USUHS, 1989), Fort Bragg, NC; Michael Reil, D.O. (Univ. Health Sci., Kansas, 1984), Fort Bragg, NC; Charles W. Rhodes, M.D. (Bowman Gray, 1980), Mt. Pleasant, NC; Sarah Cornwell Ringel, M.D. (Duke, 1985), Durham, NC; Mark D. Robinson, M.D. (Pennsylvania, 1983), Concord, NC; Paul W. Sasser, M.D. (California- Los Angeles, 1984), Eden, NC; Elizabeth A. Sengstaken, M.D. (Vermont, 1989), Fayetteville, NC; Lori J. Seymour, PA-C (Duke, 1992), Mt. Pleasant, NC; Christopher Snyder, III, M.D. (Virginia, 1975), Concord, NC; Greg Stave, M.D., J.D. (Duke, 1984), M.P.H. (North Carolina, 1989), Research Triangle Park, NC; Erika A. Steinbacher, M.D. (North Carolina, 1992), Kannapolis, NC; Loretta Stenzel, M.D. (Duke, 1986), Durham, NC; Philip E. Stover, M.D. (Eastern Virginia, 1980), Louisburg, NC; Dennis O'G. Stuart, M.D. (Med. Coll. Virginia, 1982), Elkin, NC; Michael J. Trombley, M.D. (Rochester, 1991), Concord, NC; Teresa Vanderlinde, D.O. (Philadelphia Coll. Pharm. and Sci., 1989), Fort Bragg, NC; Albert A. Verrilli, III, M.D. (Case Western Reserve, 1984), Faison, NC; Mark A. Vincent, M.D. (Virginia, 1992), Concord, NC; Eugene Wade, M.D. (Howard, 1981), Burlington, NC; Jon V. Warkentin, M.D. (Indiana, 1988), Garner, NC; Patricia S. White, M.D. (Harvard, 1986), Kannapolis, NC; Gwendolyn R. Whitley, M.D. (South Carolina, 1987), Concord, NC.

Scholar in Residence: Merrill Eisenbud, D.H.C. (Catholic Univ. of Rio de Janeiro, 1971).

Duke University Affiliated Physicians

Assistant Clinical Professors: William S. Friedman, M.D. (Tulane, 1972); Margaret Gradison, M.D. (Aurora, 1989).

Assistant Consultant Professors: John B. Anderson, M.D. (Cincinnati, 1980); Philip Singer, M.D. (Duke, 1975); William Tucker, M.D. (North Carolina, 1966).

Clinical Associates: John Michael Aquino, M.D. (Toronto, 1991); Brian Benjamin, M.D. (Rochester, 1991); Mohan Chilukuri, M.D. (Kentucky, 1982).

Consulting Associates: Joseph Baum, M.D. (Iowa, 1964); Mignon Benjamin, M.D. (Rochester, 1991); Katherine Bliss, M.D. (North Carolina, 1989); Anita Blosser, M.D. (Kentucky, 1991); Joseph Bruckert, M.D. (Dusseldorf, 1982); Isa Cheran, M.D. (Bowman Gray, 1988); Daniel Crummett, M.D. (Wayne State, 1982); Kati Dessauer, M.D. (North Carolina, 1985); Jenny Franczak, M.D. (West Virginia, 1988); Joanne Fruth, M.D. (Med. Coll. Ohio, 1987); David Johnson, M.D. (Minnesota, 1990); Robert Juer, M.D. (Tennessee, 1979); Richard Kennedy, M.D. (Illinois, 1983); Thomas Koinis, M.D. (Case Western Reserve, 1980); Thomas Lynn, M.D. (Georgetown, 1987); Rhonda Matteson, M.D. (Cincinnati, 1988); John Mills, M.D. (Bowman Gray, 1982); Jane Murray, M.D. (North Carolina, 1984); Corey Musselman, M.D. (Florida, 1991); Coin Page, M.D. (North Carolina, 1983); Pauline Perez, M.D. (California-San Francisco, 1992); Jane Satter, M.D. (Rochester, 1977); Carlos Sotolongo, M.D. (Univ. Autonoma De Guadalajara, 1981); Tamra H. Stall, M.D. (Case Western Reserve, 1987); Margaret Stetson, M.D. (Rochester, 1977); Richard Taylor, M.D. (North Carolina, 1962).

Emeriti: Arthur C. Christakos, M.D.; E. Harvey Estes, Jr., M.D.; Siegfried H. Heyden, M.D.; Dorothy E. Naumann, M.D.; Max Woodbury, Ph.D.

Required Courses

During the second year non-primary care students may select either CFM-205 or a combination of CFM-207 and MED-207, the four-week neurology clerkship. Primary care students may complete the neurology clerkship during their fourth year.

CFM-205C. Family Medicine. This basic course in family medicine consists of an eight-week clinical clerkship in the second year. The course goal is to provide students with an understanding of the principles of family medicine and how these apply in community practice. The course emphasizes continuous and comprehensive health care for people of both sexes and all ages within the context of their social groups and communities. Particular attention is paid to the diagnosis and treatment of common medical problems and to health maintenance, ambulatory care, continuity of care, and the role of consultants in primary care. Other topics covered include social factors such as the doctor-patient relationship, the role of the physician in the community, and the economics of health care delivery.

Students are placed with community-based faculty who are practicing family physicians in communities outside of Durham, principally within North Carolina. Most of these preceptorship sites are in rural communities, providing students with exposure to many issues of rural health care such as farming and other occupational injuries, transportation difficulties, and local customs. Students gain extensive experience in diagnosing and managing patient problems in an ambulatory care setting under the guidance of the department's faculty. In addition, the clerkship provides students with opportunities to see patients in a variety of other settings including home, nursing home, and community hospital. There is also the opportunity for medical students to be paired with physician assistant students at a community practice site for the purpose of working with mid-level practitioners in a team practice setting. Note: CFM-205C is strongly recommended for all students in the primary care program. Changes in the rotation are not made less than six weeks prior to the start of the rotation. Weight: 8. *J. Copeland*

CFM-207C. Family Medicine Preceptorship. Students not enrolled in the Primary Care Program may opt for a shorter Family Medicine experience. This course is similar to CFM-205C, described above, but lasts only four weeks. This shorter clerkship provides good exposure to the diagnosis and treatment of common problems in ambulatory family medicine; due to time limitations, less experience is available in prevention, community medicine, and continuity of care. Preceptorship sites are located across the state of North Carolina. Availability of sites is dependent upon approval of the preceptor. Most sites involve living in the community for the duration of the clerkship. Students are expected to complete this clerkship outside of Durham. Changes in the rotation are not made less than six weeks prior to the start of the rotation. Weight: 4. *J. Copeland*

Basic Science Electives

CFM-238B. Tutorial in Community and Family Medicine. An individually arranged experience in which the student participates in the research program of a faculty member. The subject matter, course weight, and meeting time is arranged with the faculty member. Each student meets regularly with his faculty preceptor and carries out a project related to the preceptor's work. Through these discussions and the project, the student is able to develop an understanding of the discipline involved. Possible areas include health education, geriatrics, family dynamics, occupational health, functional health and quality of life assessment, severity of illness assessment, case-mix adjustment, medical education, management sciences, economic aspects of health care, computer technology, biostatistics and epidemiology, clinical decision making, diagnosis and management of common problems, alcoholism and social support systems. Because of the variety of projects available and the necessity of prior arrangements, it is essential that interested students consult with instructor and staff at least two months before the beginning of the term selected. Prerequisite: permission of instructor. Weight: 1-16. *Michener and staff*

CFM-239B. Principles of Epidemiology. The purpose of this course is to provide students with an introduction to epidemiology with emphasis on types of community and clinical epidemiologic studies as well as the findings from these studies. The types of studies reviewed include community surveys, case-controlled clinical studies, longitudinal studies, community-based intervention studies, pharmacoepidemiology, and clinical-based intervention studies. Substantive areas covered include cardiovascular diseases, cancer, infectious diseases, psychiatric and neurological disorders, diseases of childhood and late life, and the application of epidemiology to preventive medicine. The course is taught in both lecture and discussion group format. Students are presented with a study to critique each week. Grades are assigned based on peer evaluations and a review paper. Weight: 4 Max: 15. *Blazer and Hays*

CFM-246B. Historical Studies in a Medical Specialty. This elective is offered primarily to those who have made the choice of their probable career specialty. It is intended to provide an appreciation of the developments in that specialty and thereby deepen an understanding of it. While the choice of elective topic is made on an individual basis and depend on the interests of each student, emphasis generally is placed on specific theoretical, practical, and organizational developments since the second half of the nineteenth century. The format comprises selected readings, tutorials, and a student project. Weight: 1-2. *English and Gifford*

CFM-247B. Medicine in America. The historical development of the medical profession in the United States with attention to such topics as the changing basis of authority for medical practice, the education of physicians, the impact of science and technology on health care, physician-patient relations, the organization of the profession as a whole and by specialty, the emergence of the hospital, the role of government in health care delivery and contemporary criticisms of the health care system. The history of the Duke University Medical Center provides a recapitulation of course themes. Additional units of credit may be earned through independent study. Weight: 1. *Gifford*

CFM-248B. The Development of and Perspectives on Modern Medicine. Comprised of lectures, discussion, and readings, this course outlines the general history of medicine with particular attention given to recent developments. The course includes such topics as the contributions of William Harvey, medical systems, aspects of clinical diagnosis, and the evolution of key concepts in modern medicine such as cell theory, the germ theory, antisepsis, and theories of immunity. Full use is made of the excellent resources of the Trent Collections. Additional unit of credit may be earned through independent study. Weight: 1. *Gifford*

Clinical Science Electives

CFM-250C. Clinical Nutrition. This course provides an overview and opportunity to develop skills in the assessment and management of common nutritional problems in primary care. Topics include nutritional assessment; nutrition during pregnancy and lactation, infancy and childhood, as well as senescence; nutritional management of chronic diseases (diabetes, obesity, cardiovascular disease); health promotion/disease prevention. If permitted by the instructor, this clinical science course can be audited. Weight: 1 Min: 8. *Adams*

CFM-251C. Alternative Medicine. Students assess a variety of unorthodox therapies. Weekly seminars, independent research and small group projects assist the students in learning how to evaluate the potential risks and benefits of therapies. Discussion and role playing enable the students to practice the communication skills necessary to talk with patients about their use of alternative therapies. Students are graded on class participation and presentations. Weight: 1 Min: 6 Max: 24. *Lehr and staff*

CFM-254C. Community Medicine Elective. This elective combines patient care with study of community health issues and population-based approach to treatment. Students develop an intervention plan for a problem they perceive and that is perceived by the community. Student also practice study design and implementation via a quality assurance project. This elective is held in Madison County in western North Carolina. Weight: 3 Max: 1. *B. Sheline and staff*

CFM-255C. Health Promotion and Disease Prevention. This elective is an intensive clinical experience in health promotion and disease prevention. Students see patients in the Duke Family Medicine Center, and participate in a variety of activities designed to help them provide excellent health maintenance care. Specific content areas addressed include counseling skills in nutrition, safe sex practices, and smoking and alcohol cessation, as well as screening tests and immunizations. Weight: 4 Min: 2 Max: 6. *Yarnall and staff*

CFM-256C. Ethical Issues in Medicine. This seminar examines ethical questions raised by modern biomedical science and technology with special attention to their implications for primary care practitioners. It offers both historical and systematic analysis and attends to models of physician-patient relationships. Among topics for consideration are ethical method (resource allocation, justice, and public policy), medical beneficence, and concepts of rights together with selected practice-related issues (e.g., truth-telling, confidentiality, abortion, contraception, consent, definition and meaning of death, behavior modification). If permitted by the instructor, this clinical science course can be audited. Weight: 1 Min: 2 Max: 10. *H. Smith*

CFM-257C. Philosophic Problems for Physicians. This seminar is designed to help the fourth year medical student prepare for becoming an intern/resident in the areas of dealing with patients: taking on that level of responsibility, telling the family/patient about serious illness or about the patient's terminal condition, working with a family at the time of death, and dealing personally and professionally with the kinds of pressures placed on the intern/resident (how to do more than survive the next three to five years, keeping marriage together, being a parent, etc.) Prerequisite: permission of the instructor. If permitted by the instructor, this clinical science course can be audited. Weight: 2 or 4 Min: 3 Max: 8. *Puckett and staff*

CFM-258C. Legal Issues in Medicine. A seminar which introduces participants to the basic approach of law and legal process to contemporary issues in medical care including malpractice, hospital privileges, confidentiality, natural death, abortion, consent/authorization for treatment, human experimentation, and peer review. Topics may be chosen by individual students. Common misconceptions about malpractice law and

the rights of physicians and patients as well as the legal mechanisms for resolving disputes are examined including the role of expert witnesses. If permitted by the instructor, this clinical science course can be audited. Weight: 2 Min: 5 Max: 20. *Warren*

CFM-259C. Advanced Clerkship in Family Medicine. This course provides intensive instruction and practice in the care of primary care patients in the community setting. Students may select from two sites: the Duke Family Medicine Center on the Duke campus or the Duke-FAHEC Family Medicine Center in Fayetteville. This course has an outpatient focus and is recommended for students who would like to improve their skills in the care of ambulatory patients, especially those with common problems. Students are involved with day to day patient care under the supervision of family physician faculty and residents. Because of restrictions on the number of students allowed at each site, preference is given to those students entering Family Medicine Residencies. Students are advised to contact the department as early as possible for course approval (at least eight weeks in advance). **No drops are permitted within sixty days of the first day of the rotation.** Prerequisites: permission of instructor. Weight: 2-8 Max: 4. *Andolsek and staff*

CFM-260C. Subinternship in Family Medicine. This course provides senior medical students with an intense inpatient clinical rotation with responsibilities and autonomy similar to that of an intern. The student acts as the primary medical provider for inpatients on the family medicine service in Duke Hospital and follows outpatients at the Duke Family Medicine Center in the setting of a residency program. Clinical instruction and supervision on each patient encounter are afforded by senior level housestaff and faculty members of the Department of Community and Family Medicine. Individual reading on patient problems encountered in the daily work routine is expected. Frequent balanced feedback is provided to students. Students are advised to contact the department as early as possible for course approval (at least eight weeks in advance). **No drops are permitted within sixty days of the first day of the rotation.** Prerequisites: permission of instructor. Weight: 4 Max: 2. *K. Robinson and staff*

CFM-261C. Family Medicine Continuity Experience. Students manage a panel of patients over an extended period of time at the Duke Family Medicine Center under the supervision of one family physician faculty member. Patient care is scheduled for one to two half days a week for two to four months. The rotation may be repeated to provide further continuity. A project is required for course credit. Due to the need for clinic schedule arrangements, students are advised to contact the department as soon as possible for course approval (at least eight weeks in advance). Prerequisites: permission of instructor. Weight: 2-8. *V. Johnson and staff*

CFM-271C. The Computer Textbook of Medicine. Students participate in the ongoing development of a computerized database in cardiovascular disease. They participate in research concerning the diagnosis, treatment, and prognosis of patients with coronary artery disease. And, they learn how to make predictions about outcome based on test results of patients on the cardiology service. Prerequisite: permission of instructor. Weight: 2-4 Max: 5. *Califf, Lee, and Harrell*

CFM-273C. The Ideal Physician. What is the role of the physician in relating with patients? How do you communicate with patients and families? How well do you do this? What is your "bedside manner"? How do you learn about this other than through models and self-reflection? This seminar provides a small group atmosphere for learning more about such skills and for receiving direct feedback on your own communication style and skills. If allowed by instructor, this clinical science course can be audited. Prerequisite: permission of instructor. Weight: 1-2 Min: 3 Max: 8. *Puckett and staff*

CFM-274C. The Ideal Patient. Who is the "ideal" patient? What about those who are not so ideal? This seminar combines theory and practice. Information about "difficult" personality types and effective interpersonal skills for dealing with these individu-

als are integrated into actual practice. Members of the seminar are asked to draw upon past and current experiences with difficult persons and situations as well as to focus on case presentations provided by the instructor. If permitted by the instructor, this clinical science course can be audited. Prerequisite: permission of instructor. Weight: 1-2 Min: 3 Max: 8. *Puckett and staff*

CFM-299C. Community and Family Medicine Preceptorship. An individually tailored preceptorship may be arranged for students to work with a family physician in a community practice site almost anywhere. The rotation allows students to observe and participate in the delivery of health care to individual patients and their families within the context of the community in which they live. The rotation is intended to supplement and complement the second year core clerkship. A wide variety of geographic locations and practice types are available; students may choose from an extensive list or nominate a new site. Because of the necessity for site approval and prior arrangements with preceptors, it is essential that interested students contact the instructor as soon as possible and at least four months prior to the desired rotation. **Drops are not accepted.** Prerequisites: permission of instructor. Weight: 4. *V. Johnson and staff*

DIVISION OF BIOMETRY

BTP-211B. Probability and Statistical Inference. Laws of probability, probability distributions, descriptive statistics, graphical displays of relationships, philosophy of statistical tests, tests for differences in central tendency, paired comparisons, and correlation. Parametric and nonparametric procedures. Simple linear regression and one way analysis of variance. Weight: 4. *Stinnett*

BTP-212B. Design of Etiologic and Clinical Studies. General principles of study design for clinical research. Topics will include: observation studies (descriptive, case-control and cohort) with their relative advantages and statistical methods used in their analysis; clinical trials. Epidemiologic measures, health status measures and ethical considerations will be discussed. Prerequisite: BTP-211B. Weight: 3. *Oddone and Schildkraut*

BTP-222B. Statistical Programming in SAS. Creating, manipulating, and analyzing research data using SAS. Prerequisite: BTP-211B (can be taken concurrently) and experience with PC-DOS. Weight: 2. *Sanders*

DIVISION OF MEDICAL INFORMATION SCIENCES

MIS-233B. Introduction to Medical Informatics. An in-depth study of the use of computers in biomedical applications. Important concepts related to hardware, software, and applications development will be studied through analysis of state-of-the-art systems involving clinical decision support, computer-based interviewing, computer-based medical records, departmental/ancillary systems, instructional information systems, management systems, national data bases, physiological monitoring, and research systems. C-L: BME-243 (Graduate School). Weight: 3. *Hales*

MIS-234B. Artificial Intelligence in Medicine. An introduction to basic concepts of Artificial Intelligence (AI) and an in-depth examination of medical applications of AI. The course includes heuristic programming, a brief examination of the classic AI programming languages (LISP and PROLOG) and a study of rule-based systems and cognitive models. Specific applications examined in detail include MYCIN, ONCOCIN, PIP, CASNET, ILIAD, QMR, and DXPLAIN and selected EXPERT systems. C-L: BME-241 (Graduate School). Weight: 3. *Hammond*

MIS-235B. Microprocessors and Digital Instruments. Design of microcomputer-based devices including both hardware and software considerations of system design. Primary emphasis on hardware aspects including a progression through initial design,

prototype construction in the laboratory, testing of prototypes to locate and correct faults, and final design evaluation. Evaluation includes examination of complexity, reliability, and cost. Design and construction is oriented toward biomedical devices or instruments that include dedicated microcomputers, usually operating in real time. C-L: BME-205 (Graduate School). Weight: 3. *Hammond*

MIS-399B. Preceptorship in Medical Informatics. An individualized research program under the direction and supervision ILLAD, QMR, and DXPLAIN of a member of the faculty of the Medical Information Sciences Program. Weight: 1-16. *Staff*

Genetics

Professor Joseph R. Nevins, Ph.D. (Duke, 1976), *Chairman*.

Professors: Bryan R. Cullen, Ph.D. (New Jersey Medical School, 1984); Y-T. Chen, M.D. (National Taiwan Univ., 1973), Ph.D. (Columbia, 1978).

Associate Professor: Jeffery Vance, Ph.D. (Indiana, 1979), M.D. (Duke, 1984).

Assistant Professors: F. Andrew Futreal, Ph.D. (North Carolina, 1993); Joseph Heitman, Ph.D. (Rockefeller, 1989), M.D. (Cornell, 1992); Daniel Lew, Ph.D. (Rockefeller, 1990); Douglas A. Marchuk, Ph.D. (Chicago, 1985); Andrew S. Peterson, Ph.D. (Harvard, 1988); Bruce Sullenger, Ph.D. (Cornell, 1990); Robin P. Wharton, Ph.D. (Harvard, 1986).

Research Professor: Margaret Pericak-Vance, Ph.D. (Indiana, 1978).

Required Course

GEN-200B. Genetics. A course designed for first year medical students that focuses on the principles of genetics as they apply to human disease. The course emphasizes molecular aspects of gene structure and expression, experimental systems for genetic analysis, and various aspects of human genetics including population genetics and genetic epidemiology, the use of genetic analysis for the identification of disease causing genes, cytogenetics, and genetic diagnosis and counseling. Weight: 2. *Nevins*

Immunology

Professor Thomas F. Tedder, Ph.D. (Alabama, 1984), *Chairman*.

Professors: Rebecca H. Buckley, M.D. (North Carolina, 1958); Jeffrey R. Dawson, Ph.D. (Case Western Reserve, 1969); Michael M. Frank, M.D. (Harvard, 1960); Eli Gilboa, Ph.D. (Weizmann Inst., 1977); Barton F. Haynes, M.D. (Baylor, 1973); David R. McClay, Jr., Ph.D. (North Carolina, 1971); David S. Pisetsky, Ph.D. (Albert Einstein, 1972); Jeffrey L. Platt, M.D. (Southern California, 1977); Wendell F. Rosse, M.D. (Chicago, 1958); Hilliard F. Seigler, M.D. (North Carolina, 1960); Ralph Snyderman, M.D. (SUNY, 1965); Frances E. Ward, Ph.D. (Brown, 1965).

Associate Professors: Ralph R. Bollinger, M.D. (Tulane, 1970), Ph.D. (Duke, 1977); Michael S. Krangel, Ph.D. (Harvard, 1982); Harvey J. Sage, Ph.D. (Yale, 1958).

Associate Research Professors: Andrew E. Balber, Ph.D. (Rockefeller, 1971); Kay H. Singer, Ph.D. (Duke, 1977).

Assistant Professors: Carolyn Doyle, Ph.D. (New York-Stony Brook, 1985); Robert Endres, Ph.D. (Arizona, 1976); Gary S. Gilkeson, M.D. (Southwestern, 1979); Donald L. Granger, M.D. (Utah, 1972); Russell P. Hall, M.D. (Missouri, 1975); Maureane Hoffman, M.D., Ph.D. (Iowa, 1982); Roger J. Kurlander, M.D. (Chicago, 1971); Herbert Kim Lyerly, M.D. (California-Los Angeles, 1983); Mary Louise Markert, M.D. (Duke, 1982), Ph.D. (Duke, 1981); Michael G. McHeyzer-Williams, Ph.D. (Melbourne, 1991); Yuan Zhuang, Ph.D. (Yale, 1989).

Assistant Research Professors: Donna D. Kostyu, Ph.D. (Duke, 1979).

Research Associates: Cristina Hernandez, Ph.D.; Makoto Inaoki, M.D., Ph.D.; Witte Koopmann, Ph.D.; Celia C. LaBranche, Ph.D.; Anatoli M. Malyguine, Ph.D.; Nobutaka Ono, M.D., Ph.D.; Joseph Roberts, Ph.D.; Annika Sanfridson, Ph.D.; Shinichi Sato, M.D.; Douglas Steeber, Ph.D.

Emeriti: D. Bernard Amos, M.D.; Charles E. Buckley III, M.D.; Professor Eugene D. Day, Ph.D.; Richard S. Metzgar, Ph.D.

Required Course

IMM-201B. Immunology. A short core course in immunology for first-year medical students. The course includes a general introduction to special areas of immunology such as immunochemistry, immunohematology, and immunogenetics including trans-

plantation and tumor immunology. The initial lectures describe the properties of antibodies, the characteristics of antigens, classes of reactive lymphocytes and accessory cells, the biology of cytokines and the complement system. The course is enriched with patient oriented problem-solving sessions. Weight: 2. *Dawson*

Electives

IMM-252B. General Virology and Viral Oncology. The first half of the course is devoted to a discussion of the structure and replication of mammalian and bacterial viruses. The second half deals specifically with tumor viruses which are discussed in terms of the virus-cell interaction, the relationship of virus infection to neoplasia, and the application of retroviruses in molecular and developmental biology. Permission of the instructors is required. C-L: MIC-252B; Graduate School. Weight: 4 Min: 5. *Keene, Joklik, Bastia, Kreuzer, Ostrowski, Linney, Nevins, and Pickup*

IMM-259B. Molecular Biology I: Proteins And Enzymes. Detailed concepts of the structure and function of proteins as enzymes and as structural elements of cellular substructures including: protein primary structure and its determination, patterns of protein folding, mechanisms of enzyme catalysis and regulation, function and formation of multimeric protein assemblies, proteins and other constituents of biological membranes. C-L: BCH-259B; CBI-259B; MIC-259B; Graduate School. Weight: 3. *Richardson and staff*

IMM-268B. Molecular Biology II: Nucleic Acids. Biochemistry of nucleic acids, with emphasis on their chemistry, structure, metabolism, and biological function in information transfer. Prerequisites: introductory biochemistry and Biochemistry 259. C-L: BCH-268B; MIC-268B; Graduate School. Weight: 4. *Steege and staff*

IMM-269B. Advanced Cell Biology. An advanced course in cell biology with emphasis on current research literature and featuring in-depth discussion of selected areas by staff engaged in research in these areas. The course covers membrane structure and physiology, the cytoskeleton, cell motility systems, chromosome mechanics, chromosome structure and function, and eukaryotic gene structure, control, and replication. C-L: CBI-269B; MIC-269B; Graduate School. Weight: 3. *Siedow and staff*

IMM-291B. Comprehensive Immunology. An intensive course in the biology of the immune system and the structure and function of its component parts. Major topics discussed are: properties of antigens; specificity of antibody molecules and their biologic functions; cells and organs of the lymphoid system; structure and function of complement; inflammation and non-specific effector mechanisms; cellular interactions and soluble mediators in lymphocyte activation, replication, and differentiation; regulation of immune responses, neoplasia and the immune system; molecular structure and genetic organization of immunoglobulins, histocompatibility antigens, and T cell receptor. C-L: MIC-291B; Graduate School. Weight: 4: Max: 10. *Krangel and staff*

IMM-304B. Molecular membrane Biology. Advanced seminar course on various cellular membranes; emphasis on cell biology of the immune system. Discussion topics include: biosynthesis of membrane proteins, intracellular transport vesicles, endocytosis, signal transduction across the plasma membrane, intracellular organelles and protein sorting, cell interactions in differentiation. Prerequisite: permission of instructor. C-L: MIC-304B; Graduate School. Weight: 2 Max: 16 Min: 10. *Argon*

IMM-330B. Medical Immunology. A brief review of basic concepts of immunology is followed by in-depth discussions of the role of immune mechanisms in the pathogenesis and treatment of human diseases. Principle emphasis is placed on immune deficiency diseases, hypersensitivity, alloimmunity, transplantation, infectious diseases, autoimmunity, tumor immunology, and immunohematology. When applicable the classes

include patient presentations and laboratory demonstrations. C-L: MIC-330B; Graduate School. Weight: 5. *F. Ward and staff*

IMM-399B. Preceptorship in Immunology. An individual reading and/or laboratory course in specialty areas supervised by an individual faculty member. Acceptance, nature of topic, and amount of credit by individual arrangement with proposed faculty member. Prerequisites: to be determined by instructor. Weight: 1-16. *Staff*

Interdisciplinary Courses

Required Course

IND-206C. Cost Effective Care. This is a two-week course taken during the second year that uses lectures, small group discussions, and readings to improve students' awareness and understanding of cost issues and means of cost reduction in health care systems. Analyses of patient cases and the actual charges generated are used to demonstrate application of principles of cost-effectiveness to the care of individual patients. This course is run by interdepartmental faculty involving clinical sites throughout the Medical Center, and is part of an institutional strategy to improve cost-effectiveness of care at Duke. Weight 2. *V. Johnson*

Electives

IND-300C. Interdisciplinary Seminar in Medical-Legal-Ethical Issues. The seminar is composed of students in approximately equal number from the Medical, Divinity, and Law Schools and explores important medical, legal, and ethical features of current issues, e.g., transplantation, euthanasia, abortion. Faculty and resource persons from all three schools participate in the seminar. Up to four introductory sessions in the fall semester for all participating students and faculty is held to arrange the interdisciplinary terms and selected topics. Student teams meet during the winter and consult at intervals with faculty. All semester participants re-assemble for a series of weekly meetings ending in mid-March to present and discuss the topics researched. Any topics properly focused may be considered. Course covers fall section 82 and spring section 81. If permitted by instructor, this course can be audited. Weight: 2 Max: 6. *Gianturco (Medical), Shimm (Law), Smith (Divinity) and other faculty members from all three schools*

IND-302C. Exploring Medicine: Cross-Cultural Challenges to Medicine in the Twenty-first Century. The purpose of this course is to promote professional self-definition and understanding of the role of cross-cultural medical care. It provides students with a conceptual framework and process to facilitate the search for meaning in their professional lives which draws on art, history, literature, music, philosophy, and religion. This seminar is designed to explore two dimensions of medicine. The first is that of self-identification of the meaning of medicine for the medical student and the second is that of the exploring the meaning of medicine in a different culture. Understanding of the cultural aspects of medical care and medicine responses to these are carried out by multidisciplinary faculty. A multidisciplinary view of the medicine and medical care in another culture is also developed in the seminar. A trip to Honduras during spring break is offered to interested faculty and students. This optional "laboratory" experience allows students to interface with medical students and Honduran medical school faculty. Weight: 2 Max: 12 Min: 6. *Hage*

Medicine

Frederic M. Hanes Professor Barton F. Haynes, M.D. (Baylor, 1973), *Chair*.

DIVISION OF CARDIOLOGY

Professor: Gary L. Stiles, M.D. (Vanderbilt, 1975), *Chief*.

Professors: Thomas M. Bashore, M.D. (Ohio, 1972); Victor S. Behar, M.D. (Duke, 1961); Robert M. Califf, M.D. (Duke, 1978); Fred R. Cobb, M.D. (Mississippi, 1964); James B. Duke Professor Joseph C. Greenfield, Jr., M.D. (Emory, 1956); Joseph R. Kisslo, M.D. (Hahnemann, 1967); James B. Duke Professor Robert J. Lefkowitz, M.D. (Columbia, 1966); James J. Morris, M.D. (SUNY, 1959); Robert H. Peter, M.D. (Duke, 1961); Edward S. Orgain Professor of Medicine Harold C. Strauss, M.D. (McGill, 1964); Robert E. Whalen, M.D. (Cornell, 1956).

Associate Professors: Augustus O. Grant, M.D. (Edinburgh, 1971); Michael B. Higginbotham, M.D. (Melbourne, 1973); Daniel B. Mark, M.D. (Tufts, 1978); Kenneth Morris, M.D. (Ohio, 1972); Christopher M. O'Connor, M.D. (Maryland, 1983); Kevin G. Peters, M.D. (Iowa, 1983); Harry R. Phillips, M.D. (Duke, 1975); Robert A. Rosati, M.D. (Duke, 1967); Thomas J. Ryan, M.D. (Indiana, 1981); Richard S. Stack, M.D. (Wayne State, 1976); Martin J. Sullivan, M.D. (Ohio State, 1980); Galen S. Wagner, M.D. (Duke, 1965); Robert Waugh, M.D. (Pennsylvania, 1966); J. Marcus Wharton, M.D. (Vanderbilt, 1980).

Associate Research Professors: Jack T. Cusma, Ph.D. (Wisconsin, 1983); Judith C. Rembert, Ph.D. (North Carolina, 1972).

Assistant Professors: Brian H. Annex, M.D. (Yale, 1985); Donald F. Fortin, M.D. (Massachusetts, 1984); Neil J. Freedman, M.D. (Harvard, 1985); Samuel E. George, M.D. (Washington Univ. 1980); Christopher B. Granger, M.D. (Connecticut, 1984); Ruth Ann Greenfield, M.D. (Duke, 1985); Robert A. Harrington, M.D. (Tufts, 1986); J. Kevin Harrison, M.D. (New York Univ., 1984); James G. Jollis, M.D. (Ohio, 1986); William E. Kraus, M.D. (Duke, 1982); Mitchell W. Krucoff, M.D. (George Washington, 1980); Andrea Natale, M.D. (Univ. Firenze, 1985); L. Kristin Newby, M.D. (Indiana, 1987); E. Magnus Ohman, M.D. (Royal Coll. Surgeons, 1981); Michael H. Sketch, M.D. (Creighton, 1984); Robert A. Sorrentino, M.D. (Albany Med. Coll. 1985); James Tcheng, M.D. (Johns Hopkins, 1988); James P. Zidar, M.D. (Loyola, 1985).

Assistant Research Professors: Paul Dolber, Ph.D. (Duke, 1980); Mark E. Olah, Ph.D. (Ohio, 1988); Julie A. Pitcher, Ph.D. (Univ. Dundee, 1988); Richard T. Premont, Ph.D. (City University of New York, 1992); Doris A. Taylor, Ph.D. (Texas-Southwestern, 1987).

Associates: Michael A. Blazing, M.D. (California-San Francisco, 1987); Carolyn L. Donovan, M.D. (Texas-Southwestern, 1988); Kenneth W. Mahaffey, M.D. (Washington, 1989).

DIVISION OF CLINICAL PHARMACOLOGY

Professor: Edward L. C. Pritchett, M.D. (Ohio, 1971), *Chief*.

DIVISION OF DERMATOLOGY

J. Lamar Callaway Professor of Dermatology Sheldon R. Pinnell, M.D. (Yale, 1963), *Chief*.

Professor: Russell P. Hall, M.D. (Missouri, 1975).

Associate Professors: Claude S. Burton, M.D. (Duke, 1979); John C. Murray, M.D. (Duke, 1977); Elise A. Olsen, M.D. (Baylor, 1978); Neil S. Prose, M.D. (New York Univ., 1975).

Associate Research Professors: Saood Murad, Ph.D. (California-Davis, 1978); Heather N. Yeowell, Ph.D. (North Carolina, 1982).

Assistant Professors: Robert E. Clark, M.D. (Texas, 1985); James M. Grichnik, M.D. (Harvard, 1990); Sarah C. Myers, M.D. (Duke, 1989).

Associate: Peggy Tong, M.D. (Chicago-Pritzker, 1992).

DIVISION OF ENDOCRINOLOGY, METABOLISM, AND NUTRITION

Professor: Marc K. Drezner, M.D. (Pittsburgh, 1970), *Chief*.

Professors: Perry J. Blackshear, M.D. (Harvard, 1977); Mark N. Feinglos, M.D. (McGill, 1973); Keith Parker, M.D. (Washington Univ., 1981).

Associate Professors: Warner M. Burch, M.D. (Bowman Gray, 1971); Richard V. Clark, M.D. (Washington, 1977); George J. Ellis, M.D. (Harvard, 1963); Jerome M. Feldman, M.D. (Northwestern, 1961); John R. Guyton, M.D. (Harvard, 1973).

Associate Research Professors: Bruce Lobaugh, Ph.D. (Pennsylvania State, 1981); Teresa Nesbitt, Ph.D. (Duke, 1986).

Assistant Professors: Ann J. Brown, M.D. (Stanford, 1988); Leslie J. Domalik, M.D. (Pittsburgh, 1986); Michael J. Econs, M.D. (California-San Francisco, 1983); Kristine D. Harper, M.D. (Michigan State, 1980); Diana B. McNeill, M.D. (Duke, 1982).

Assistant Research Professors: Spencer A. Brown, Ph.D. (Pennsylvania, 1984); Wendy Demark-Wahnefried, Ph.D. (Syracuse, 1988); Pao-Hwo Lin, Ph.D. (Texas-Austin, 1990); Deborah J. Stumpo, Ph.D. (West Virginia, 1984).

Associate: Louis Luttrell, M.D. (Virginia, 1989).

DIVISION OF GASTROENTEROLOGY

Professor: Rodger A. Liddle, M.D. (Vanderbilt, 1978), *Chief*.

Professors: Paul G. Killenberg, M.D. (Pennsylvania, 1963); Michael McLeod, M.D. (Duke, 1960); Joanne A. P. Wilson, M.D. (Duke, 1973).

Associate Professors: John Baillie, M.B. (Glasgow, 1977); Scott R. Brazer, M.D. (Case Western Reserve, 1981); Jonathan A. Cohn, M.D. (Rockefeller, 1978); John T. Garbutt, M.D. (Temple, 1962); Thomas T. Long, M.D. (Bowman Gray, 1966); Steven H. Quarfordt, M.D. (New York Univ., 1960).

Assistant Professors: M. Stanley Branch, M.D. (Med. Coll. Georgia, 1984); Paul S. Jowell, M.D. (Univ. Capetown, 1983); Peter J. Mannon, M.D. (Boston, 1983); Jane E. Onken, M.D. (George Washington, 1987); Dawn Provenziale, M.D. (Albany, 1984); Ala Sharara, M.D. (Beirut, 1987).

Associates: Dan Ciaccia, M.D. (Wisconsin, 1989); Wendy Z. Davis, M.D. (Duke, 1989); James F. Trotter, M.D. (Emory, 1989).

Instructor, Temporary: Don C. Rockey, M.D. (Med. Coll. Virginia, 1984).

DIVISION OF GENERAL INTERNAL MEDICINE

Professor: Harvey J. Cohen, M.D. (SUNY, 1965), *Acting Chief*.

Associate Professors: Francis A. Neelon, M.D. (Harvard, 1962); David B. Matchar, M.D. (Maryland, 1980); Eugene Z. Oddone, M.D. (Colorado, 1985); David L. Simel, M.D. (Duke, 1980); Jeremy Sugarman, M.D. (Duke, 1986).

Associate Research Professor: Ronnie D. Horner, Ph.D. (Ohio State, 1984).

Assistant Professors: Charles O. Beauchamp, M.D. (Duke, 1975); Douglas C. McCrory, M.D. (Miami, 1986); James A. Tulskey, M.D. (Illinois, 1987); Eric C. Westman, M.D. (Wisconsin, 1986).

Assistant Research Professor: Fredrick K. Homan, Ph.D. (Michigan, 1993).

Associates: Lori A. Bastian, M.D. (Emory, 1987); Patrick J. Cawley, M.D. (Georgetown, 1992); S. Tublu Chatterjee, M.D. (Boston, 1990); Rowena J. Dolor, M.D. (Duke, 1991); David E. Edelman, M.D. (Baylor, 1991); Lisa A. Giannetto, M.D. (Loyola, 1986); Lawrence H. Greenblatt, M.D. (Northwestern, 1990); Faith H. Holcombe, M.D. (Washington Univ., 1980); Sheri A. Keitz, M.D. (Mount Sinai, 1991); Lynn E. Keplinger, M.D. (West Virginia, 1990); Lia S. Logio, M.D. (Johns Hopkins, 1992); John J. Paat, M.D. (Med. Coll. Ohio, 1984); Robert W. Paterson, M.D. (Duke, 1979); Amy W. Shaheen, M.D. (Washington Univ., 1989); Jeannette F. Stein, M.D. (North Carolina, 1981); Kathleen A. Waite, M.D. (Duke, 1990); John D. Whited, M.D. (West Virginia, 1990); Stephen J. Wilson, M.D. (Duke, 1992); Eugene E. Wright, M.D. (Duke, 1978).

Instructor, Temporary: Marisa D'Silva, M.D. (North Carolina, 1992).

DIVISION OF GERIATRICS

Professor: Harvey Jay Cohen, M.D. (SUNY, 1965), *Chief*.

Associate Professors: Kenneth W. Lyles, M.D. (Med. Coll. Virginia, 1974); Lina-Marie Obeid, M.D. (Beirut, 1983); Kenneth E. Schmadier, M.D. (Bowman Gray, 1980).

Associate Research Professors: Connie Bales, Ph.D. (Tennessee, 1981); Elizabeth Clipp, Ph.D. (Cornell, 1984); Joseph T. Hanlon, Pharm.D. (North Carolina, 1990).

Assistant Professors: Anthony N. Galenist, M.D. (South Alabama, 1986); Helen Hoeing, M.D. (Arizona, 1985).

Assistant Research Professors: Melody Hobbies, M.D. (Kentucky, 1982); Miriam Smith, Ph.D. (Maryland, 1986).

Associates: Arline Bohannon, M.D. (SUNY-Syracuse, 1988); Debra K. Weiner, M.D. (Missouri, 1983); Heidi K. White, M.D. (Washington Univ., 1989).

DIVISION OF HEMATOLOGY

Professor: Marilyn J. Telen, M.D. (New York Univ., 1977), *Chief*.

Professors: Florence McAllister Professor Wendell F. Rosse, M.D. (Chicago, 1958); J. Brice Weinberg, M.D. (Arkansas, 1969).

Associate Professors: Charles S. Greenberg, M.D. (Hahemann, 1976); William H. Kane, M.D. (Washington Univ., 1982); Roger J. Kurlander, M.D. (Chicago, 1971).

Assistant Professors: Scott D. Berkowitz, M.D. (Jefferson, 1979); Thomas L. Ortel, M.D. (Indiana, 1985); Paul Shami, M.D. (Beirut, 1988).

DIVISION OF INFECTIOUS DISEASES

Professor: John D. Hamilton, M.D. (Colorado, 1964), *Chief*.

Professors: Daniel J. Sexton, M.D. (Northwestern, 1971); Kenneth H. Wilson, M.D. (North Carolina, 1974).

Associate Professors: John A. Bartlett, M.D. (Virginia, 1981); G. Ralph Corey, M.D. (Baylor, 1973); John Perfect, M.D. (Med. Coll. Ohio, 1975).

Assistant Professors: Gary M. Cox, M.D. (Virginia, 1989); Richard Frothingham, M.D. (Duke, 1981); Carol D. Hamilton, M.D. (Utah, 1985); Charles B. Hicks, M.D. (George Washington, 1979); Souha Kanj, M.D.

(St. Joseph, 1987); Kathryn B. Kirkland, M.D. (Dartmouth, 1986); G. Diego Miralles, M.D. (Buenos Aires, 1986); Mark D. Perkins, M.D. (Southwestern, 1984).

Assistant Research Professor: Dena L. Toffaletti, Ph.D. (North Carolina, 1977).

Associates: Alison E. Heald, M.D. (Pennsylvania, 1986).

DIVISION OF MEDICAL ONCOLOGY

Professor: Russel Kaufman, M.D. (Ohio, 1973), *Chief*.

Professors: O. Michael Colvin, M.D. (Washington Univ., 1961); Jon P. Gockerman, M.D. (Chicago, 1967); Yusuf A. Hannun, M.D. (Amer. Univ. Beirut, 1981); Andrew T. Huang, M.D. (Taiwan, 1965); Joseph O. Moore, M.D. (Johns Hopkins, 1971).

Associate Professors: Jeffrey Crawford, M.D. (Ohio State, 1974); James W. Hathorn, M.D. (Duke, 1979); Thomas F. Newcomb, M.D. (Pittsburgh, 1951); James J. Vredenburg, M.D. (Vermont, 1983); Eric P. Winer, M.D. (Yale, 1983).

Associate Research Professors: David Adams, Ph.D. (Nebraska, 1979); Susan M. Ludeman, Ph.D. (Catholic Univ., 1979); Sandra L. White, Ph.D. (Michigan, 1974).

Assistant Professors: Gerold Bepler, M.D. (Philipps Univ., 1983); Carlos de Castro, M.D. (Southwestern, 1985); Maha ElKordy, M.D. (North Carolina, 1988); Marc Gautier, M.D. (Dartmouth, 1986); Clayton A. Smith, M.D. (Southwestern, 1984); Linda M. Sutton, M.D. (Massachusetts, 1987).

Assistant Research Professors: Alieja Bielawska, Ph.D. (Tech Univ. Wroclaw, 1975); Donald E. Fleenor, Ph.D. (Emory, 1987); Michael P. Gamcsik, Ph.D. (Edinburgh, 1983).

Associates: Raymund S. Cuevo, M.D. (Yale, 1986); Jennifer L. Garst, M.D. (Med. Coll. Georgia, 1990); Herbert I. Hurwitz, M.D. (Jefferson, 1988); Scott G. Lilly, M.D. (Medical College Ohio, 1991); Michael Morse, M.D. (Yale, 1990); Peter Rubin, M.D. (Calgary, 1988); Robert A. Wolff, M.D. (Albany, 1986).

Instructor, Temporary: Nelson J. Chao, M.D. (Yale, 1981).

DIVISION OF NEPHROLOGY

Associate Professor: Thomas M. Coffman, M.D. (Ohio, 1980), *Chief*.

Professors: James R. Clapp, M.D. (North Carolina, 1957); Steve J. Schwab, M.D. (Missouri, 1979); William E. Yarger, M.D. (Baylor, 1963).

Associate Professors: L. Darryl Quarles, M.D. (Alabama, 1979); Laura P. Svetkey, M.D. (Harvard, 1979).

Assistant Professors: Michael S. Berkoben, M.D. (Pennsylvania, 1986); David W. Butterly, M.D. (Duke, 1987); Peter J. Conlon, M.D. (Royal Coll. Surgery, 1986); Eugene C. Kovalik, M.D. (McGill, 1987); Roslyn B. Mannon, M.D. (Duke, 1985); Stephen R. Smith, M.D. (Duke, 1985); Robert F. Spurney, M.D. (Ohio, 1983).

Associates: Lori Carter-Edwards, Ph.D. (North Carolina, 1995); Michael I. Oliverio, M.D. (West Virginia, 1990).

DIVISION OF NEUROLOGY

Jefferson-Pilot Corporation Professor of Neurobiology Allen D. Roses, M.D. (Pennsylvania, 1967), *Chief*.

Professors: Carl R. Deane Professor of Neuroscience James O. McNamara, M.D. (Michigan, 1968); Donald B. Sanders, M.D. (Harvard, 1964); Warren J. Strittmatter, M.D. (Duke, 1973).

Research Professor: Margaret Pericak-Vance, Ph.D. (Indiana, 1978).

Associate Professors: Mark J. Alberts, M.D. (Tufts, 1982); Larry B. Goldstein, M.D. (Mt. Sinai, 1981); Barrie H. Hurwitz, M.D. (Witwatersrand Univ., 1968); Janice M. Massey, M.D. (Georgetown, 1978); Rodney A. Radtke, M.D. (Northwestern, 1980); Marvin Rozear, M.D. (Duke, 1966); Donald Schmechel, M.D. (Harvard, 1974); Ara Tourian, M.D. (Iowa, 1958); Jeffery M. Vance, M.D. (Duke, 1984).

Assistant Professors: Mark T. Brown, M.D. (Illinois, 1984); James R. Burke, M.D. (SUNY-Brooklyn, 1985); Nancy L. Earl, M.D. (North Carolina, 1982); Carmelo Graffagnino, M.D. (West-Ontario, 1985); David A. Hosford, M.D. (Emory, 1983); Joel C. Morgenlander, M.D. (Pittsburgh, 1986); Richard W. Tim, M.D. (California-San Diego, 1986); Kevan VanLandingham, M.D. (Virginia, 1985).

Assistant Research Professors: Kamel BenOthmane, M.D. (Tunis Med. Sch., 1984); John R. Gilbert, Ph.D. (North Carolina, 1982); Manisha N. Patel, Ph.D. (Purdue, 1992); Ram S. Puranam, Ph.D. (Indian Inst., 1986); Ann Saunders, Ph.D. (Duke, 1987); Marcy Speer, Ph.D. (Duke, 1993).

Associate: Burton L. Scott, M.D. (Miami, 1990).

Visiting Associate in Medicine: Michael P. Vitek, Ph.D. (Dartmouth, 1983).

DIVISION OF PULMONARY AND CRITICAL CARE MEDICINE

Professor: William J. Fulkerson, M.D. (North Carolina, 1977); *Acting Chief*.

Professors: Neil R. MacIntyre, M.D. (Cornell, 1972); Claude Piantadosi, M.D. (Johns Hopkins, 1975); Jonathan Stamler, M.D. (Mt. Sinai, 1985); Stephen L. Young, M.D. (California-San Francisco, 1968).

Research Professor: Fredrick J. Miller, Ph.D. (North Carolina State, 1977).

Visiting Professor of Medicine: Werner Hofmann, Ph.D. (Vienna, 1973).
 Associate Professor: Victor F. Tapson, M.D. (Hahnemann, 1982).
 Associate Research Professor: Ling-Yi Chang, Ph.D. (North Carolina State, 1982).
 Assistant Professors: Rodney J. Folz, M.D. (Washington Univ., 1989); Y. C. Tony Huang, M.D. (National Taiwan, 1983); Douglas G. Kelling, M.D. (Harvard, 1972); Peter S. Kussin, M.D. (Mount Sinai, 1985); Michael L. Russell, M.D. (North Carolina, 1985).
 Assistant Research Professors: Barbara Buckley, Ph.D. (Johns Hopkins, 1985); Brian J. Day, Ph.D. (Purdue, 1992); Yun Zhao, Ph.D. (Shanghai Med. Univ., 1990).
 Associates in Medicine: Joseph A. Govert, M.D. (California-Irvine, 1989); Loretta G. Que, M.D. (Chicago-Pritzker, 1989); Karen Welty, M.D. (Duke, 1986).
 Visiting Associate: Stephen B. Bocckino, Ph.D. (UMDNJ, 1983).

DIVISION OF RHEUMATOLOGY, ALLERGY AND CLINICAL IMMUNOLOGY

Professor: David S. Pisetsky, M.D. (Albert Einstein, 1973), *Chief*.
 Professors: Michael S. Hershfield, M.D. (Pennsylvania, 1967); Frederic M. Hanes Professor Barton F. Haynes, M.D. (Baylor, 1973); Nicholas M. Kredich, M.D. (Michigan, 1962); James B. Duke Professor of Medicine Ralph Snyderman, M.D. (SUNY-Downstate, 1965).
 Associate Professors: Nancy B. Allen, M.D. (Tufts, 1978); Peter Bressler, M.D. (Duke, 1981); David S. Caldwell, M.D. (Bowman Gray, 1967); Rex M. McCallum, M.D. (Vanderbilt, 1980); John R. Rice, M.D. (Miami, 1968); E. William St. Clair, M.D. (West Virginia, 1980).
 Associate Research Professor: Kay H. Singer, Ph.D. (Duke, 1977).
 Assistant Professors: Virginia B. Kraus, M.D. (Duke, 1982); Dhavalkumar Patel, M.D. (Duke, 1989).
 Assistant Research Professors: Hydar Ali, Ph.D. (Univ. Coll. London, 1986); Haribabu Bodduluri, Ph.D. (Indian Inst., 1984); Hua-Xin Liao, Ph.D. (North Carolina, 1991); M. Richardo Richardson, Ph.D. (Barcelona, 1988); Herman F. Staats, Ph.D. (South Alabama, 1992).
 Associate in Medicine: John S. Sundry, M.D. (Hahnemann, 1991).

ADJUNCT FACULTY

Professor of Experimental Medicine: James E. Nidel, M.D. (Miami, 1973).
 Adjunct Associate Professors of Medicine: John S. Penta, Ph.D. (Purdue, 1967); Walter J. Rogan, M.D. (California, San Francisco, 1975).
 Adjunct Assistant Professors of Medicine: Edward Breitschwerdt, D.V.M. (University of Georgia, 1974); Richard Kent, M.D. (California at San Diego, 1975); Victor A. Molina-Viamonte, M.D. (Salvador, 1981); Jack A. Taylor, M.D. (Wisconsin, 1984).
 Adjunct Assistant Professor of Experimental Medicine: John J. O'Neil, Ph.D. (California-San Francisco, 1974).

CONSULTING FACULTY

Consulting Professors: David T. Durack, M.B. (West Australia, 1969); J. Gregory Fitz, M.D. (Duke, 1979); Robert A. Gutman, M.D. (Florida, 1962); Eric N. Prystowsky, M.D. (Mount Sinai, 1973); Barry W. Ramo, M.D. (Colorado, 1964); Eric J. Topol, M.D. (Rochester, 1979).
 Associate Consulting Professors: Thomas D. Brown, M.D. (Med. Coll. Virginia, 1979); Robert S. Gilgor, M.D. (Pennsylvania, 1962); David B. Pryor, M.D. (Michigan, 1976).
 Assistant Consulting Professors: Syed Ahmed, M.D. (Dow Med. Coll., 1967); June Almenoff, M.D. (Mt. Sinai, 1985); Roy M. Ambinder, M.D. (Columbia, 1975); Franc A. Barada, M.D. (Virginia, 1971); Robert P. Bauman, M.D. (Wayne State, 1977); Camille L. Bedrosian, M.D. (Harvard, 1983); Robert N. Belkin, M.D. (Cornell, 1980); Charles F. Bethea, M.D. (Oklahoma, 1971); Frederic Blum, M.D. (New York Univ., 1985); Dean A. Bramlett, M.D. (Illinois, 1976); J. Trig Brown, M.D. (Washington Univ., 1977); A. Alan Chu, M.D. (Duke, 1980); Gary J. Collins, M.D. (USUHS, 1982); Edwin Cox, M.D. (Duke, 1971); Stephen C. Culp, M.D. (Vermont, 1986); Philip H. Dunn, M.D. (Duke, 1976); Lewis D. Elliston, M.D. (Baylor, 1969); Andrew J. Ghio, M.D. (Boston, 1981); F. Roosevelt Gilliam, M.D. (Duke, 1981); Albino Gomez-Uria, M.D. (Madrid Sch. Med., 1962); Rochelle M. Hanley, M.D. (Michigan, 1978); M. Alycia Hassett, M.D. (Duke, 1978); Christine M. Hunt, M.D. (Boston, 1982); Eric M. Janis, M.D. (Johns Hopkins, 1989); Elizabeth Kanof, M.D. (New York Univ., 1960); G. Wallace Kernodle, M.D. (North Carolina, 1981); L. Allen Kindman, M.D. (Mount Sinai, 1983); Allan R. Krusell, M.D. (Tufts, 1986); Gunther Lallinger, M.D. (Ludwig, 1972); Douglas E. Lemley, M.D. (West Virginia, 1982); Virginia A. Lightner, M.D. (Duke, 1982); B. Gail Macic, M.D. (Texas-San Antonio, 1983); Allen W. Mangel, M.D. (Georgetown, 1988); S. Spence McCachren, M.D. (Duke, 1978); Frank A. McGrew, M.D. (Case Western Reserve, 1970); J. Frederick McNeer, M.D. (Duke, 1972); Linville M. Meadows, M.D. (North Carolina, 1982); Roderick B. Meese, M.D. (Cincinnati, 1981); Gwenesta B. Melton, M.D. (Tulane, 1979); Lefkos T. Middleton, M.D. (Univ. Louis Pasteur, 1976); Robert D. Mitchell, M.D. (Michigan, 1982); Brant S. Mittler, M.D. (Duke, 1972); Eva L. Morgenstern, M.D. (Connecticut, 1976); Rebecca L. Moroosse,

M.D. (Connecticut, 1980); John J. Murphy, M.D. (Northwestern, 1982); Joseph A. Puma, D.O. (New York Coll. Osteopathy, 1985); Robert B. Reynolds, M.D. (Royal Coll. Surgeons, 1984); John B. Simpson, M.D. (Duke, 1973); David K. Smith, M.D. (Case Western Reserve, 1974); Mark P. Steele, M.D. (Illinois, 1982); James G. Wall, M.D. (North Carolina, 1982); Abe Walston, M.D. (Duke, 1963); James O. Wynn, M.D. (Cornell, 1951); Lee H. Zehngebot, M.D. (Pennsylvania, 1976).

Consulting Associates: Fred H. Allen, M.D. (Columbia, 1959); David J. Ahr, M.D. (Georgetown, 1969); Faye T. Banks, M.D. (Virginia, 1982); L. Thomas Barber, M.D. (George Washington, 1982); Habiassil, M.D. (St. Joseph, 1980); Kenneth R. Beer, M.D. (Pennsylvania, 1989); Polly A. Beere, M.D. (Chicago, 1986); Ira M. Bernstein, M.D. (Bowman Gray, 1970); Nayan K. Bhatt, M.D. (Sheffield Univ., 1981); Alan M. Blaker, M.D. (Maryland, 1984); James F. Boyd, M.D. (Duke, 1974); Garrett Bressler, M.D. (Duke, 1978); Louis L. Brunetti, M.D. (Mount Sinai, 1983); Dwayne D. Callwood, M.D. (Med. Coll. Virginia, 1989); Paul Campbell, M.D. (Temple, 1985); Raul G. Castillo, M.D. (Ponce Sch. Med., 1985); Geoffrey S. Chapman, M.D. (California-San Francisco, 1975); Ambrose Chiang, M.D. (Taipei Med. Coll., 1981); Paul R. Conkling, M.D. (Ohio, 1982); James C. Cook, M.D. (Tulane, 1976); James H. Cooke, M.D. (Duke, 1976); Thomas A. Dalton, M.D. (Maryland, 1987); James D. Daniels, M.D. (Med. Coll. Virginia, 1966); William T. Donovan, M.D. (St. Louis, 1964); Manuel H. Enriquez, M.D. (East-Ramon Magsaysay, 1979); Richard B. Everson, M.D. (Rochester, 1972); Kenneth A. Fath, M.D. (Ohio State, 1986); Richard Goulah, M.D. (St. George, 1982); Ralph Gousse, M.D. (Faculte de medicine d'Haiti, 1982); Robert A. Harrell, M.D. (Johns Hopkins, 1980); James N. Harris, M.D. (Emory, 1973); Douglas L. Hill, M.D. (Vanderbilt, 1987); Vasundhara G. Iyengar, M.D. (Bangalore, 1970); Robert J. Jacobson, M.D. (Witwatersrand, 1966); Dennis C. Kabasan, M.D. (Univ. Graz, 1977); Roger Karam, M.D. (Univ. of Los Andes, 1980); Gerrit A. Kimmey, M.D. (Med. Univ. South Carolina, 1979); Joseph M. Kmonicek, M.D. (Jefferson, 1980); Fred M. Krainin, M.D. (Boston, 1981); Gilbert A. Leidig, M.D. (Pennsylvania, 1984); Stanley Levy, M.D. (Georgetown, 1971); Richard N. Lind, M.D. (Illinois, 1977); Elisabeth A. McKeen, M.D. (Albany, 1974); Gary P. Miller, M.D. (Virginia, 1976); G. Radford Moeller, M.D. (Duke, 1977); David C. Molthrop, Jr., M.D. (Louisiana State, 1987); Ritwick Panicker, M.D. (Christian Med. Coll., 1982); Alexander Paraschos, M.D. (Med. Coll. Virginia, 1986); James E. Pope, M.D. (Eastern Virginia, 1978); Robert E. Pryor, M.D. (Baylor, 1986); Michael A. Rave, M.D. (USUHS, 1989); Veronica J. F. Ray, M.D. (North Carolina, 1979); John D. Reed, M.D. (North Carolina, 1986); David F. Rhodes, M.D. (Vanderbilt, 1985); David N. Robinson, M.D. (Florida, 1989); Vera Ann Rose, M.D. (East Tennessee, 1985); Neal A. Rothschild, M.D. (UMDNJ, 1981); Manfred Rothstein, M.D. (Duke, 1974); Stephen H. Royal, M.D. (SUNY-Downstate, 1981); Augustin J. Schwartz, M.D. (Jefferson, 1971); Roger L. Seagle, M.D. (Bowman Gray, 1979); Jeffrey T. Seder, M.D. (CETEC Univ., 1982); Willie J. Sessions, M.D. (Tufts, 1985); Sydney G. Short, M.D. (West Virginia, 1983); Daniel L. Spitz, M.D. (Med. Univ. South Carolina, 1980); Robert K. Stack, M.D. (Wayne State, 1981); Thomas A. Steffens, M.D. (Tufts, 1982); Jean-Francois Tanguay, M.D. (Montreal, 1987); Mitchell A. Toomey, M.D. (Tennessee-Memphis, 1984); Thomas F. Trahey, M.D. (Bowman Gray, 1984); Constantine-Dean Tseretopoulous, M.D. (St. George, 1982); Janet K. Vasey, M.D. (Indiana, 1983); Diane M. Williams, M.D. (Minnesota, 1987); Boshra George Zakhary, M.D. (Ain Shams Univ., 1981); William J. Zimmer, M.D. (Wisconsin, 1986).

CONSULTING ASSOCIATES (Duke University Affiliated Physicians): Martha B. Adams, M.D. (Virginia, 1976); Todd L. Burstain, M.D. (Southwestern, 1990); Ron D. Fleming, M.D. (Vanderbilt, 1984); Ronald F. Halbrooks, M.D. (Texas Med. Branch, 1983); Jeffrey J. Harrow, M.D. (Baylor, 1979); Keith Hassan, M.D. (West Virginia, 1990); Paul E. Kile, M.D. (Tufts, 1982); Carol Kirschenbaum, M.D. (North Carolina, 1991); Carlton David Miller, M.D. (North Carolina, 1987); Colleen P. Ramsey, M.D. (New Jersey, 1992); Deborah B. Rost, M.D. (Brown, 1991); Michael B. Shipley, M.D. (Duke, 1974); Robert D. Stewart, M.D. (West Virginia, 1974); Raymond J. Toher, M.D. (Duke, 1975); William F. Uthe, M.D. (Med. Coll. Ohio, 1974); Kelley E. White, M.D. (North Carolina, 1990); James C. Womble, M.D. (North Carolina, 1986).

CLINICAL FACULTY

Clinical Professors: Herbert A. Saltzman, M.D. (Jefferson, 1952); Robert Silber, M.D. (SUNY-Downstate, 1954).

Associate Clinical Professors: Charles Ellenbogen, M.D. (Chicago, 1964); Byron B. Hamilton, M.D. (SUNY-Syracuse, 1959).

Assistant Clinical Professors: Richard L. Callihan, M.D. (Marshall, 1989); Maha Elkordy, M.D., (North Carolina, 1988); Lyndsay N. Harris, M.D. (Alberta, 1988); Frank Pancotto, M.D. (Chicago, 1975); William P. Petros, Ph.D. (Philadelphia Coll. Pharm., 1987); Zeses C. Roulidis, M.D. (Virginia, 1986); Jack I. Twersky, M.D. (Hahnemann, 1982).

Assistant Clinical Professors in Medicine: Conrad C. Fulkerson, M.D. (Missouri, 1969); Darryl C. Zeldin, M.D. (Indiana, 1986).

Clinical Associates: Colleen J. C. Gilbert, Ph.D. (North Carolina, 1993); Linda H. Harpole, M.D. (Duke, 1992); David F. Lobach, M.D. (Duke, 1987); E. Wayne Massey, M.D. (Texas-Galveston, 1970).

Emeriti: C. Edward Buckley, M.D.; Walter L. Floyd, M.D.; J. Caulie Gunnells, M.D.; Albert Heyman, M.D.; Jacqueline C. Hijmans, M.D.; Charles Johnson, M.D.; Walter Kempner, M.D.; Yi-Hong

Kong, M.D.; Johannes A. Kylstra, M.D.; Harry T. McPherson, M.D.; Barbara Newborg, M.D.; Richard M. Portwood, M.D.; Herbert O. Sieker, M.D.; Harold R. Silberman, M.D.; Eugene A. Stead, Jr., M.D.; Malcolm P. Tyor, M.D.; James B. Wyngaarden, M.D.

Required Courses

MED-205C. Medicine. The second year course in medicine provides students with the basic information and skills used in the practice of medicine. It is a time when students consolidate what they have learned during the first year and apply it to the study of their "own" patients. Since it is not possible to cover systematically the entire body of internal medicine during the eight weeks, students are provided a series of representative learning experiences based on the case-study method. The goals are to teach a method of patient evaluation and care and to provide a firm foundation in the solving of medical problems that will be helpful in the months and years ahead. We specifically expect that: (1) Students will perform and record a history and physical examination on each patient they admit. During the first four weeks on the rotation, students evaluate two patients per week; thereafter, three patients per week. (2) Students will discuss the care of their patients with the resident after the resident has assessed the patient. Student and resident will return to the bedside to resolve any discrepant historical or physical examination findings. (3) The student's complete work-up (including analysis of the peripheral blood smear, urine sediment and sputum gram stain when appropriate) will be in the chart within 24 hours. (4) Students will take primary care responsibility for their patients, following them daily and writing progress notes in the chart. Students are responsible for knowing the rationale for all therapeutic interventions and/or diagnostic tests and the outcome of these maneuvers. (5) Students will participate in diagnostic procedures, such as lumbar punctures or thoracenteses and, where appropriate, perform these procedures under the supervision of the house staff. (6) Students will *always* make daily work rounds with house staff. In order to participate in patient care decisions, students will see patients *before* work rounds. (7) Students will prepare for case presentations by reading relevant sections in a standard textbook of medicine. (8) Students will present patients to an attending physician within 24 hours of admission; they will know the rationale for work-up and all pertinent medical information. (9) Attending rounds will not be missed without the prior permission of the attending physician. (10) Students will attend all Grand Rounds and Student Lecture Series unless ward duties preclude. Weight: 8. *Neelon*

MED-207C. Neurology. The second year course in neurology provides the student with a firm understanding of the neurological examination, formulation of clinical neurological problems, and practice with written and oral communications in a hospital setting. The student has the opportunity to apply the neuroanatomy, neurophysiology, neurochemistry, and neuropathology learned in the first year to the evaluation and care of his or her patients. Each student is assigned patients from the neurology services at Duke Hospital or the Durham VA Medical Center. The student elicits a history and performs a physical examination. The student records the findings in the hospital charts and presents the findings at regular staff rounds. The student then participates with a clinical team of faculty and house officers in the hospital evaluation of the patients. The student is encouraged to participate in all diagnostic procedures such as lumbar puncture. The student has the opportunity to follow patients through neuro-radiological and neuro-surgical procedures forming part of evaluation and treatment.

The specific expectations for the sophomore student are: (1) to perform and record a competent neurological and history examination on each admitted patient, (2) to be competent in the hospital management of neurological patients including diagnostic appropriate electrical studies, (3) to assume responsibility as the primary care person for his or her patients, to include daily progress notes on hospital charts, and to be familiar with the results of all therapeutic interventions and diagnostic tests performed on his patients, (4) to participate in daily work rounds with an assigned team of house officers and faculty, (5) to be sufficiently knowledgeable to be able to participate in patient care decisions, (6) to attend

faculty attending rounds and to present his patients to faculty within twenty-four hours after admission, and (7) to participate in neurology service rounds and conferences during the course.

The course includes faculty lectures. A written evaluation is provided to the students by faculty and house staff. There is an examination.

This course is usually taken in conjunction with CFM-207. Weight: 4. *Morgenlander*

Electives

MED-210C. Advanced General Medicine (Duke/Durham-VA). (1) Course Goals: To expand the experience and knowledge gained during the second year medicine clerkship. Primary - Providing additional experience in the management of hospitalized patients with a wide variety of general internal medical problems. Secondary - Developing a comprehensive understanding of the pathophysiology of the common problems encountered on an internal medicine inpatient service. This course is recommended for students who receive a straight grade of Pass in MED-205C. (2) How Goals Are Achieved: Students are assigned to one of the general medical wards at either Duke or the VA Hospital. They are assigned patients in rotation with the second year students on the service and are expected to perform and complete an initial evaluation, develop a care plan, write the orders (to be countersigned by the intern), present the patient at teaching rounds, and follow the patient throughout the hospital course. Students are assigned three to five patients per week and are expected to do outside reading on each. The student may be advanced to the subinternship level during the eight week period at the recommendation of the chief medical resident. (3) Methods of Evaluation: The evaluation form is made available to each student at the beginning of the rotation. There are formal mid-term and final evaluations. No final exam is given. Requests for Duke or Durham VA rotation are accepted on first come, first served basis. Call 286-2243. Weight: 10 Max: 6. *Haynes and staff*

MED-211C. Internal Medicine Subinternship (Duke/Durham-VA). (1) Course Goals: To provide an internal medicine patient care experience at the intern level. (2) How Goals Are Achieved: Students are assigned to one of the two inpatient services (Duke or VA) and are supervised by a second or third year internal medicine resident. The student functions as an intern on that service with the exception that orders must be countersigned by a medical house officer. A pager and sleep-in facilities are available. No other medical intern is assigned to those patients handled by the subintern. The number of patients assigned is determined by the supervising resident with anticipated increases during the course. (3) Methods of Evaluation: Students are evaluated by their resident and senior staff attending. The evaluation form is made available to each student at the beginning of the rotation. There is an informal evaluation at two weeks and a formal evaluation at four weeks. No final exam is given. Prerequisites: available only to Duke medical students who receive grades of Honors or P+ in MED-205C. Students must obtain the written permission of Dr. Frank Neelon to register for or drop this course. Requests for Duke or Durham VA are accepted on first come, first served basis. Call 286-2243. Weight: 5 or 10 Max: 13. *Haynes and staff*

MED-213C. Tutorial in Medical PDC. (1) Course Goals: Primary--To broaden student exposure to ambulatory care in internal medicine and allow students to work intensively with a single, seasoned medical practitioner. Students will learn the informational content relevant to the specialty, but also have the opportunity to observe how one doctor goes about the daily practice of the specialty. (2) How Goals Are Achieved: Students work in a one-to-one relationship with a faculty member in the Department of Medicine who see patients regularly in the Medical PDC. Students evaluate under the guidance of the preceptor, and develop plans for treatment and follow-up. Students may follow patients admitted to the hospital. Students may select preceptors from General Internal Medicine or any of the medical sub-specialties. (3) Methods of Evaluation: The

preceptor observes the student's interaction with patients and the quality of the student's evaluation, including assessments, plans, and follow-up on a daily basis. Prerequisites: Students must prearrange their elective with an individual preceptor and communicate the preceptor's approval to Dr. Neelon (286-2243). Weight: 2 (10 hrs/wk for 8 weeks), 4 (full time for 4 weeks or 20 hrs/wk for 8 weeks or 10 hrs/wk for 16 weeks), or 8 (full time for 8 weeks). *Neelon and staff*

MED-220C. Emergency Room. (1) Course Goals: Primary - To provide a broad exposure in the Emergency Room to clinical problems, emphasizing acute internal medicine in such a way that students can see patients before any other physician contact permitting the learner to make diagnoses and plan short-term "workups". Secondary - To develop students' ability to rapidly obtain history and shorten the amount of time required to do accurate physical examination, to enhance students' dexterity when performing minimally invasive procedures, and to teach the concepts of triage and prehospital care. (2) How Goals Are Achieved: Each student works with attending physicians and residents (not interns). Each student works nineteen twelve-hour shifts and in general does not spend the night. In collaboration with residents or senior staff, students are involved in diagnostic procedures and interpretation of studies before planning management of illness. Thus, students can test their ability to make diagnoses and plan acute studies. Didactic sessions cover clinical topics related to emergency medicine and complement a daily morning report. Working with nurses at triage station permits view of a function rarely seen by learners of medicine. Students electing this rotation work on both non-acute and acute side of the emergency department. They are involved in the management of patients who have myocardial infarction, life threatening arrhythmias, medical coma, pulmonary edema, status epilepticus, severe GI bleeding, and drug overdose. Students become more proficient in EKG interpretation and their clinical relevance is stressed on this rotation. (3) Methods of Evaluation: Residents and senior staff evaluate the student's gain in rapidity of doing history/physical examinations, increased dexterity in performance of minimally invasive procedures, and increase in knowledge and skill to interpret/present data to others. Each student presents a case and lead a discussion on the diagnosis and proper emergency management and evaluation of the patient. Prerequisites: none mandatory, prior experience in other electives is beneficial. Weight: 4 or 8 Min: 1 Max: 4. *Wellman*

MED-223C. Intensive Care Medicine Subinternship (Duke). (1) Course Goals: Primary - To introduce the student to a pathophysiologic approach to critically ill adults. Secondary - To provide an opportunity for students to perform selected procedures. (2) How Goals Are Achieved: Students function as subinterns in a very active intensive care unit. Patient evaluations, procedures, diagnostic planning and treatment planning are performed by students under the direct supervision of the junior assistant resident, critical care fellow, and attending physician. Night call occurs every third night. Regular didactic lectures on topics related to the diagnosis and treatment of the critically ill are given by the attending staff. The physiological and biochemical approach to critical care medicine is stressed. A syllabus of selected reprints from the critical care literature is provided to each student. Emphasis is placed on access to attending physicians and critical care fellows for the discussion of specific patient oriented questions. Preferences for the month of rotation are honored, if possible. Questions should be directed to Dr. Fulkerson, 681-5850. (3) Methods of Evaluation: Each student's performance is assessed by the unit director through direct observation of the student in the clinical and didactic environments. Input from the residents, fellows, and other attending physicians is also obtained. Weight: 5 Max: 3. *Fulkerson and critical care staff*

MED-224C. Intensive Care Medicine Subinternship (Durham-VA Hospital). (1) Course Goals: Primary - To provide training in clinical physiologic and pharmacologic principles of the care of the critically ill. Secondary - To develop students' skills in performance and interpretation of diagnostic procedures. (2) How Goals Are Achieved:

Under the supervision of junior assistant residents and a pulmonary fellow, students function as subinterns and are responsible for patient workups and daily bedside presentations. Students are given responsibilities for procedures and decision-making in direct proportion to the development of their patient management skills. Daily attending rounds stress an integrated physiologic approach to the management of critically ill patients with emphasis on acute respiratory care, hemodynamic monitoring, acid-base balance, and nutritional support. Each student is provided with a syllabus of selected readings that supplements regular didactic sessions on diagnosis, pathophysiology, and management of critical illness. Student on call schedule is every third night for the duration of this four-week course. *The student registered for MED-224C may drop the course up to one month before the start date. After that time, the student must arrange for a replacement if he/she subsequently drops the course.* (3) Methods of Evaluation: Student evaluations are done by the fellows and faculty attending on the MICU and are based on observed performance. Information may be obtained by telephoning 286-6946 or 684-6143. Weight: 5 Max: 3. *Piantadosi and pulmonary staff*

MED-230C. Pulmonary Medicine. (1) Course Goals: Primary -To provide training in clinical aspects of pulmonary medicine. The primary diseases emphasized include asthma, chronic obstructive lung disease, pulmonary vascular diseases including pulmonary embolus, acute respiratory failure, hypersensitivity, interstitial and immunologic lung diseases and pulmonary manifestations of systemic illnesses, i.e., sarcoid, scleroderma, cystic fibrosis, etc. Secondary - To provide experience with pulmonary laboratory techniques including pulmonary function testing, cardio-pulmonary exercise testing, chest radiology, and bronchoscopy. (2) How Goals Are Achieved: Students assigned to the Pulmonary Consult Services at either the VA or at Duke Hospital. They have primary responsibility for workup and presentation of selected patients on these services. All patients are presented and followed at daily rounds with fellows and faculty. Students also participate in a half-day outpatient clinic each week. Joint seminars and conferences involving both the Duke and VA Consult Services are held each week to provide instruction in pulmonary function evaluation, pulmonary physiology, chest radiology, pulmonary pathology and clinical pulmonary medicine. (3) Methods of Evaluation: Student evaluations are done by fellows and faculty assigned to the Consult Services during the period of the course and are based on observed performance. Weight: 4 Min: 1 Max: 4. *Fulkerson and pulmonary staff*

MED-242C. Clinical Arrhythmia Service. (1) Course Goals: Primary -To provide students with an in-depth exposure to the diagnosis and management of cardiac arrhythmias, electrophysiologic studies, ablation of arrhythmias, cardiac pacemakers, and implantable defibrillators; to help students to understand the electrophysiologic events that result in arrhythmias and ECG changes. This course is not designed to be a substitute for the general cardiology elective (MED-240C). Secondary -To familiarize the student with certain basic techniques of arrhythmia diagnosis such as esophageal recording and pacing. (2) How Goals Are Achieved: The student spends four weeks working on the Clinical Arrhythmia Service. The student makes rounds with the Clinical Electrophysiology Service on inpatients with arrhythmia problems. The student is encouraged to attend electrophysiologic studies and assist in the analysis of data from these studies. Attendance of electrophysiologic surgical procedures is also encouraged. The student is responsible for the work-up of patients admitted to the Arrhythmia Service as well as inpatient consults and plays an important role in the follow up of these patients while they are in the hospital. The student sees outpatients during Arrhythmia Clinics that meet on Monday, Tuesday, Wednesday, and Thursday in the PDC. The student assists in the evaluation of patients for permanent pacemaker implantations. Students are responsible for reviewing the literature on subjects related to the patients that they have seen on the clinical service. (3) Methods of Evaluation: Students are evaluated on their clinical skills in taking histories, performing physical examinations

as well as in their presentation and assessment of the patient's problem. They are also assessed on their ability to read and understand the relevant literature and their ability to assume a responsible role in the care of patients on the Clinical Arrhythmia Service. Weight: 4 Max: 1. *Wharton, Pritchett, Grant, Greenfield, and Sorrentino*

MED-243C. Cardiology Subinternship (Asheville VA). (1) Course Goals: Primary - To provide experience in the assessment and management of patients with acquired heart disease. Secondary - To familiarize the student with both invasive and non-invasive procedures available at this medical center. (2) How Goals Are Achieved: The student is assigned to an attending cardiologist and is expected to work up patients presenting to both the coronary care unit and the cardiology nonacute ward. Daily work rounds commence at 7:30 a.m. with additional student teaching rounds occurring three times a week. In addition, daily interpretation of electrocardiograms, stress tests, Holter monitors, and echocardiograms focus on student teaching. Cardiac catheterization results also are reviewed on a daily basis. Night call is optional, but students may elect to take call with appropriate attendings. (3) Methods of Evaluation: The preceptor evaluates the student's ability to assess patient problems based on the history and physical and to formulate a plan to evaluate the problems. Furthermore, the preceptor assesses each student's ability to evaluate and act upon data derived from both invasive and non-invasive diagnostic methods. Weight: 4 Max: 2. *Xenopoulos, Ahmad, and Dawood*

MED-244C. In-Patient Cardiology. (1) Course Goals: Primary - To provide an in-depth experience in the evaluation and care of in-patients with various cardiovascular problems requiring hospitalization. Secondary - To refine student understanding of the cardiovascular history, physical examination and non-invasive and invasive laboratory testing in evaluating and managing patients with known or suspected cardiovascular disease. (2) How Goals Are Achieved: Students are assigned to the Duke CCU, the VA CCU, or to the private cardiology in-patient service at Duke. They, in concert with the housestaff, cardiology fellows, and senior staff attendings, work up and manage patients admitted to these various services. They also participate in a core curriculum experience, including individually assigned times to work with the cardiology patient simulator and various computer assisted instruction programs. Because of the considerable logistics involved in scheduling and coordinating the various cardiology electives, students who wish to drop must do so at least one week before the scheduled starting date. After that time, drops are allowed only if a replacement student can be provided. (3) Methods of Evaluation: Students are evaluated by all resident, fellow, and senior staff with whom they work. The evaluation questionnaire is available at the beginning of the elective. Depending on circumstances, students may also be evaluated by written and practical examinations at the beginning and/or end of the elective. Weight: 5 Min: 1 Max: 6. *Waugh and cardiology staff*

MED-245C. Consultative Cardiology. (1) Course Goals: To refine student understanding of normal and pathologic cardiovascular physiology while functioning in the role of a consultant for in-patients with various cardiovascular problems; to develop the skills necessary to quickly and accurately interpret ECGs. (2) How Goals Are Achieved: Students are assigned to the consult service at either the VA Hospital or Duke, where, in concert with the SAR, fellow and senior staff attending, they evaluate the operative risk for non-cardiac surgery as well as make decisions concerning cardiac surgery in patients with ischemic and other types of heart disease. Students participate extensively in reading ECGs. They also participate in a core curriculum experience including individually assigned times to work with the cardiology patient simulator and various computer assisted instruction programs. (3) Methods of Evaluation: Students are evaluated by the resident, fellow, and senior staff with whom they work. The evaluation questionnaire is made available at the beginning of the elective. Depending on circumstances, students may also be evaluated by written and practical examinations at the

beginning and/or end of the elective. Weight: 4 Min: 1 Max: 7. *Waugh and cardiology staff*

MED-250C. Clinical Dermatology. Course Goals: To train students to notice and recognize both common and rare dermatological physical findings so that they may be able in the future to: (1) describe physical findings in the skin accurately; (2) formulate a reasonable differential diagnosis based on what is seen; (3) know when biopsy or referral is indicated; (4) prescribe appropriate therapy; and (5) recognize important dermatologic findings related to significant health problems. Students on the rotation spend two weeks in the Duke clinics and two weeks at the V.A. Hospital. While at Duke, students rotate through Private Dermatology Clinics, Public Dermatology Clinics, Dermatologic Surgery Clinics, and various sub-specialty clinics. At the V.A., there are two major Outpatient Clinics each week supplemented by daily Acute Care Clinic/Screening-Clinic/ER walk-in consultations. Students also participate in the inpatient consult services and assist in the supervision of inpatient dermatology patients. There is no night or weekend call on the rotation. The clinic experiences are supplemented with lectures and teaching conferences. Interesting cases are presented weekly at a Wednesday morning conference. The majority of the teaching is one-on-one. Student evaluations are based on development of clinical skills as assessed by faculty and residents. Any special needs can be discussed with the course director who may be reached at 684-5146. Students are to report to the Dermatology Clinic, Room 0027, Orange Zone at 0830 the first day of the rotation for further orientation and clinic assignment. Weight: 4 Max: 4.

Prose

MED-255C. Pharmacotherapy of Common Problems in Internal Medicine. This course covers pharmacologic therapy of major problems in internal medicine and is appropriate for both third and fourth year students. It emphasizes how basic pharmacologic actions of drugs are translated into practical therapeutic effects. The course includes lectures by faculty in the Department of Pharmacology on basic mechanisms of drug action and lectures by faculty from the Department of Medicine on clinical use of drugs. Topics are included when therapeutic recommendations are based on large, controlled clinical trials rather than clinical conviction that is unsupported by objective evidence. Topics covered include common clinical problems such as heart failure, hypertension, arthritis, inflammatory bowel disease, and acid-base disorders. Evaluation is by mid-term examination and final examination. CL: PHR-255B. Weight: 2 Min: 2. *Pritchett and Nadler*

MED-260C. Gastroenterology. (1) Course Goals: Primary - To provide an experience with digestive diseases from which the student can develop a sound fundamental approach to the diagnosis and management of these problems. Secondary -To provide an exposure to recent advances in the field including therapeutic and diagnostic endoscopy; to stimulate questions concerning digestive diseases and to attract students into the field. (2) How Goals Are Achieved: Participation in the care, work-up and management of patients hospitalized on the general wards of Duke or the VA Hospital under the guidance of the resident, fellow, and faculty members assigned either to the VA or Duke Consultation Service. The students' experience may include participation in the activities of the clinic endoscopy unit of the Division of Gastroenterology. This unit offers specialized tests and/or procedures necessary for the state of the art care of patients with digestive diseases. Procedural activities include upper endoscopy, endoscopic retrograde cholangiopancreatography, colonoscopy and polypectomy and endoscopic papillotomy of the ampulla of Vater. Data derived from these and other laboratory studies are discussed in the context of specific patient problems in weekly conference settings. Students have an opportunity to interact with all the faculty of the Division at morning rounds and other conferences where patients from all of the services (Duke and VA) are discussed. (3) Methods of Evaluation: Student evaluation forms are completed by the resident, fellows, and faculty working with the student on individual

patient care services. Final evaluation represents a composite of these forms that chiefly identifies clinical skills, fund of basic information, organizational ability, and degree of interest and participation. Weight: 4 Max: 4. *Liddle and gastroenterology staff*

MED-270C. Outpatient Hematology-Oncology (Duke or Durham VA). (1) Course Goals: To give the student experience in the diagnosis, long-term treatment, and supportive care of patients with hematologic and oncologic disorders in the outpatient setting. The use and interpretation of peripheral blood films and other specialized laboratory tests (e.g., bone marrow aspirate/biopsy, serum electrophoresis, coagulation studies, tumor markers, leukemia cell markers), as well as an approach to the evaluation and treatment of common hematologic problems (anemias, bleeding and clotting disorders, hematologic and solid tissue malignancies) are included. Issues such as quality of life and care of the geriatric oncology patient are addressed. (2) How Goals Are Achieved: The student is assigned a staff member as preceptor with whom to work in the Hematology/Oncology clinic one half day per week. If desired, a preceptor who concentrates mainly on hematology or oncology may be arranged. This course is offered for eight or, preferably, sixteen weeks. (3) Methods of Evaluation: Students are evaluated by their preceptors on the basis of their ability to obtain a history, perform a physical examination, evaluate hematologic and other laboratory data, and propose assessments and plans of action. Weight: 1-2 Max: 4. *Kaufman and hematology/oncology staff*

MED-272C. Clinical Hematology And Oncology (Duke or Durham VA). (1) Course Goals: Students learn how to interpret peripheral blood films, how to use and interpret other specialized laboratory tests (e.g., bone marrow aspirate/biopsy, serum electrophoresis, coagulation studies, tumor markers, leukemia cell markers), and how to approach the evaluation and treatment of common hematologic problems (anemias, bleeding and clotting disorders, hematologic and solid tissue malignancies). (2) How Goals Are Achieved: Students receive a series of core lectures, gain familiarity with chemotherapy regimens and administration, and attend the ongoing clinical, research, and didactic divisional conferences. Clinical duties include the performance of inpatient consults under the supervision of a fellow and staff member. Students may opt to pursue a broad experience in hematologic and oncologic problems or may choose to focus on a particular area, e.g., coagulation and transfusion, experimental therapeutics of malignancy, bone marrow transplant, hemoglobinopathies. Students choosing the broad experience may elect to spend one week on the coagulation/transfusion consult service. This course may be taken for four or eight weeks. (3) Methods of Evaluation: The students are expected to perform and present initial evaluations of consult cases including peripheral blood film on daily rounds, and to perform limited literature searches and evaluations of chosen clinical topics. Weight: 4 or 8 Max: 4. *Kaufman and hematology/oncology staff*

MED-274C. Medical Subinternship In Hematology-Oncology. (1) Course Goals: This is an intensive experience in the care of inpatients with serious hematologic and oncologic disorders. The student learns to interpret peripheral blood films, how to use and interpret other specialized laboratory tests (e.g. bone marrow aspirate/biopsy, serum electrophoresis, coagulation studies, tumor markers, leukemia cell markers), and how to approach the evaluation and treatment of hematologic and solid tissue malignancies and their complications. (2) How Goals Are Achieved: Under supervision of a Hematology/Oncology fellow and a division staff member, the student is given considerable responsibility in the care of inpatients on one of the Hematology/Oncology or Experimental Therapeutics wards in Duke North. They receive instruction and guidance in performing diagnostic and therapeutic procedures and gain experience in the use of chemotherapeutic drug regimens. Specific issues such as quality of life, care of the aging patient with malignancy, and decisions regarding DNR status are addressed by the patient-care team. In addition, students receive a series of core lectures, receive training in chemotherapy, and attend the ongoing clinical, research and didactic divisional

conferences. (3) Methods of Evaluation: Students are evaluated by their preceptors on the basis of their ability to obtain a history, perform a physical examination, evaluate hematologic and other laboratory data, and propose assessments and plans of action. Prerequisite: Approval of the faculty based on prior performance. Weight: 5 Max: 4. *Kaufman and hematology/oncology staff*

MED-275C. Clinical Coagulation. (1) Course Goals: Primary-- To teach the clinical and laboratory approach to patients with a hemorrhagic or thrombotic disorder. The student learns to evaluate clinical coagulation disorders and become familiar with coagulation laboratory testing and interpretation. Secondary--To expose the student to recent advances in the area of coagulation research. (2) How Goals Are Achieved: The student spends four weeks on the Clinical Coagulation Consult Service under the direction of Dr. Charles Greenberg, Dr. William Kane, Dr. Thomas Ortel, or Dr. Scott Berkowitz. The student is expected to work-up inpatients referred to the Coagulation Service as well as participate in a half day a week Coagulation Outpatient Clinic. The rotation includes Coagulation lab rounds during which the student learns to interpret lab tests and review abnormal results. The student may be expected to present patients at the weekly clinical coagulation conference and to briefly discuss the evaluation and management of the patient supported by a limited literature review. Students electing to do an eight week rotation have a more extensive laboratory and clinical research experience. (3) Methods of Evaluation: The student's performance is evaluated by the Coagulation attending with input from the fellow on the service. The evaluation are based on observation of the student's ability to do careful histories and physical examinations, to appropriately assess the problem and develop a logical diagnostic and therapeutic plan, and to demonstrate an increase in knowledge regarding laboratory tests and their application to clinical problems. Weight: 4 or 8 Max: 2. *Ortel, Greenberg, Kane, and Berkowitz*

MED-280C. Clinical Infectious Diseases. (1) Course Goals: To provide experience in the clinical and laboratory diagnosis of infectious diseases and in their therapy. The primary emphasis is placed on learning from interaction with patients, resident staff, and faculty on the consultation service. Students are expected to work up assigned patients by interview, physical examination, and collation of laboratory results, leading to a summary and synthesis of the problem. Particular emphasis is placed on close follow-up of the patients during hospitalization, including attendance at procedures or operations whenever possible. Students should know their own patients well enough to be able to give a reasonable presentation on ward rounds or at conferences without notice. Students are expected to read standard texts in-depth about their patients' problems, as well as a few recent relevant primary references. Students are expected to attend the various conferences listed on the weekly schedule of division activities punctually including Microbiology Plate Rounds, Journal Club, and tutorials. They are asked to present cases and provide some discussion at the Thursday V.A. Conference. Each student should be prepared to present and briefly discuss articles that he or she considers to be interesting and timely at Journal Club. (2) Methods of Evaluation: Each student's performance is evaluated and graded by the resident, fellow, and attendings, using the usual "honors", "pass plus", "pass", "deferred", or "unsatisfactory" system that is utilized internally in the Department of Medicine. In arriving at a consensus, appropriate emphasis is placed on knowledge, enthusiasm, and evidence of improvement during the rotation. There is no written examination. Adds are accepted at any time providing the course has not been filled. However, because this course is usually oversubscribed, drops are not accepted within thirty days of the first day of classes unless the student finds his own replacement. MED-280C is a full-time experience. Also, it is offered as a sole-enrollment course and, as such, cannot be taken in conjunction with any other course without the permission of the advisory dean and the course director. Weight: 4 Max: 5. *Hamilton and infectious diseases staff*

MED-290C. Metabolism and Endocrinology. (1) Course Goals: Primary—The student has an in-depth experience in the evaluation and management of patients with endocrine disorders. Secondary— The student learns basic principles of hormone physiology and apply these concepts in clinical settings. (2) How Goals Are Achieved: Each student is introduced to patient problems by working with the Endocrine Faculty (Drs. Brown, Burch, Clark, Domalik, Drezner, Econs, Ellis, Feinglos, Feldman, Guyton, Harper, or McNeill.) Prior arrangements may be made with a particular faculty member under the appropriate course number. The student is exposed to clinical endocrine disorders by seeing patients in three endocrine outpatient clinics (Bone and Mineral, Diabetes/General Endocrine, and VA General Endocrine Clinic), as well as experiencing the inpatient Endocrinology Diabetes Management/General Endocrine Consult Service. The student has the opportunity to review general literature on common endocrinologic conditions and endocrinologic emergencies as well as learning basic assessment skills of the patient with diabetes, thyroid disease, and other common endocrinologic presentations. Division conferences include Grand Rounds, Research Seminar, Inpatient Attending Rounds, and Consult Rounds with opportunities to integrate basic concepts with clinical applications. (3) Methods of Evaluation: A written critique is provided by the student's preceptors with comments from other members of the division as appropriate. Weight: 4 Max: 3. *McNeill and endocrinology staff*

MED-300C. Nephrology. (1) Course Goals: Primary - To provide clinical experience in the diagnosis, assessment and treatment of renal diseases and hypertension. Secondary - To integrate renal physiology, immunology, pathology, and biochemistry into the clinical assessment of renal diseases. (2) How Goals Are Achieved: Students participate fully in both inpatient and outpatient assessment of patients presenting with fluid and electrolyte disorders, problem hypertension, acute renal failure, end-stage renal disease, and related complications. The student rounds daily with a renal fellow or senior resident, attends regular faculty teaching rounds and scheduled conferences devoted to correlations with basic science review of renal biopsy material, transplantation, etc. Special emphasis is placed on renal physiology and pathophysiology, renal histopathology, and hypertension. Students may elect to participate at the VA Hospital or on the private or nonprivate services at Duke. (3) Methods of Evaluation: Written comments from the faculty. Weight: 4 Max: 4. *Schwab and nephrology staff*

MED-301C. Fluids And Electrolytes. (1) Course Goals: Primary –To provide an applied approach to the management of fluid and electrolyte problems encountered in clinical medicine. To do this, cases are presented as problem-solving examples. The goal is to develop a systematic approach to the analysis of specific electrolyte derangements and to the correct selection of appropriate intravenous replacement therapy. These case studies are interwoven with a series of lectures designed to review specific areas such as compartmentalization of body fluids, derangements in acid-base balance, diuretic selection and use, analysis and approach to the treatment of potassium problems, etc. Secondary—To integrate basic renal physiology with clinical problems of fluid and electrolytes metabolism. (2) How Goals Are Achieved: Classroom experience. Does not involve patient exposure. (3) Methods of Evaluation: Final exam. If permitted by the instructor, this clinical science course can be audited. Weight: 2 Min: 6. *Berkoben and nephrology staff*

MED-307C. Neurology Clerkship. This course is restricted to those students who did not take the Neurology rotation in their second year. It provides the student with a firm understanding of the neurological examination, formulation of clinical neurological problems, and practice with written and oral communications in a hospital setting. The student has the opportunity to apply the neuroanatomy, neurophysiology, neurochemistry, and neuropathology learned in the first year to the evaluation and care of his or her patients. The patients are drawn from the neurology services at Duke Hospital or the Durham VA Medical Center. The students elicit a history and perform a physical

examination. The student records the findings in the hospital charts and presents the findings at regular staff rounds. The student then participates with a clinical team of faculty and house officers in the hospital evaluation of the patients. The student is encouraged to participate in all diagnostic procedures such as lumbar puncture. The student has the opportunity to follow patients through neuro-radiological and neuro-surgical procedures forming part of evaluation and treatment. The specific expectations for the student are: (a) to perform and record a competent neurological and history examination on each admitted patient; (b) to be competent in the hospital management of neurological patients including diagnostic evaluations such as hematological and urine evaluations, lumbar puncture and appropriate electrical studies; (c) to assume responsibility as the primary care person for his or her patients; (d) to participate in daily work rounds with an assigned team of house officers and faculty; (e) to be sufficiently knowledgeable to participate in patient care decisions; (f) to attend faculty attending rounds and to present patients to faculty within twenty-four hours after admission; and (g) to participate in neurology service rounds and conferences during the course. The course includes faculty lectures. A written evaluation is provided to the students by faculty and house staff. There is an examination. Weight: 4 Max: 1. *Morgenlander and neurology staff*

MED-308C. Clinical Neurology Subspecialties. (1) Course Goals: To provide the student to clinical exposure to a specific subspecialty in neurology. (2) How Goals Are Achieved: The student focuses on one specific subspecialty in neurology and attends clinic for 3-8 hours weekly. During that time the student participates in the clinical evaluation of patients with a member of the neurology faculty. Clinical experience in neuromuscular diseases, epilepsy and sleep disorders, cerebrovascular disorders, memory disorders, or neuro-oncology are available. Appropriate reading material is utilized to complement the clinical experience. MED-207C or MED-307C are prerequisites for this course. (3) Method of Evaluation: Standard written evaluation form by faculty supervisor. Approval by the course director in order to ensure access to the desired neurologic subspecialty is required. Weight: 1-2 Max: 5 (if participating in different subspecialties). *Morgenlander and neurology staff*

MED-309C. Consultative Neurology. (1) Course Goals: To introduce senior medical students to the diagnostic and treatment issues encountered on the consultative neurology service. (2) How Goals Are Achieved: The student becomes part of the inpatient neurology consultation team either at Duke Hospital or the Durham VA Hospital. This team consists of senior neurology attendings on a rotating basis as well as a neurology and/or medicine house officer. Consultations are performed by the student under the guidance of the house staff and then are presented to the attending on rounds. The student is responsible for performing a neurologic history and physical as well as assisting in the interpretation of all important laboratory data. The student continues to follow the patient's course as required. The student also attends rounds when other patients are presented by the house officers. Appropriate reading material is utilized to compliment the clinical experience. Attendance at Neurology Grand Rounds and various Neurologic Subspecialty Conferences are required. Experience on an inpatient neurology service such as MED-207C or MED-307C are prerequisites for this course. (3) Method of Evaluation: Standard written evaluation by faculty supervisor with house staff input. Weight: 4 Max: 2. *Morgenlander and neurology staff*

MED-310C. Neurology Subinternship. (1) Course Goals: To provide a neurological patient care experience at the intern level. Students have the opportunity to apply neurological examination skills learned in the second year to direct patient care situations. Students are exposed to a variety of neurological problems, procedures, and therapies. This course is recommended for the student interested in neurology, psychiatry, internal medicine, neurosurgery, neuropathology or ophthalmology. (2) How Goals Are Achieved: Students are assigned to the Duke or Durham VA Hospitals' neurology

ward and take call in rotation with a medical intern as part of a patient care team. Students attend Neurology-Neurosurgery Grand Rounds, Neurology Subspecialty Conferences and participate in all ward activities. Full time participation is expected. (3) Methods of Evaluation: Resident and staff physician provide a written evaluation and grade. Weight: 5. Min: 1 Max: 1. (more than one with course director's approval) *Morgenlander and neurology staff*

MED-320C. Rheumatic And Immunological Diseases. (1) Course Goals: Primary - To provide experience in the recognition and care of patients with rheumatic, chronic inflammatory, immunological diseases, including the various forms of arthritis, connective tissue disease, vasculitis, and metabolic arthropathies. Secondary - To develop skills in the interpretation of specialized laboratory studies relating to the evaluation of patients with rheumatic, immunological, and metabolic disorders. Students are also exposed to joint aspiration and injection, synovial fluid analysis, bone and joint radiology, histopathological analysis of tissue. (2) How Goals Are Achieved: Students evaluate patients at the Duke and Durham VA Hospitals. Daily rounds are held with faculty, house staff, and students that focus on oral presentation of patients with detailed review of pertinent laboratory, x-ray and pathological findings. Basic Science Conference, Bone and Joint Radiology Conference, Pathology Conference, and Rheumatology, Allergy, and Clinical Immunology Grand Rounds are held on a regular basis. Emphasis is placed on a comprehensive approach to the evaluation and treatment of patients with rheumatic, inflammatory, immune and metabolic disorders. Students are assigned primary house officer level responsibilities on the Consultation Service and the Outpatient Clinics at the Duke or Durham VA Hospitals. (3) Methods of Evaluation: Student evaluations are based on their performance on rounds and in the clinics, including history and physical examination skills and outside reading. This is a sole-enrollment course and, as such, cannot be taken in conjunction with any other course. Weight: 4 Max: 4. *St. Clair and rheumatology/allergy/immunology staff*

MED-321C. Introduction to Clinical Rheumatology. (1) Course Goals: An introductory course in Clinical Rheumatology designed to introduce students to the basics of differential diagnosis in the field of rheumatic disease; to provide more detailed knowledge of the most common, major groups of rheumatic disorders. (2) How Goals Are Achieved: Didactic and interactive lectures are the primary mode of teaching. Handouts and outlines on relevant topics and the *Primer of Rheumatic Diseases* are provided at the beginning of the course. One or more sessions(s) are devoted to patient presentations, with several patients available for questioning and discussion. Basic pathophysiology, clinical features, laboratory studies, radiographic findings and pathology correlations are presented. (3) Methods of Evaluation: Participation in class and discussion of subject matter in concluding session. Course director evaluates student with standard Duke evaluation. Weight: 1 Min: 3 Max: 20. *N. Allen and rheumatology staff*

MED-400C. Geriatric Medicine. (1) Course Goals: Primary -To enable the student to become familiar with the principles of caring for the geriatric patient. Secondary - To familiarize the student with the physiology and diseases of aging. (2) How Goals Are Achieved: This elective is offered by the interdepartmental faculty of the Division of Geriatric Medicine. The student works with faculty, fellows, and housestaff in a number of settings involved in the care of the geriatric patient. These include the Geriatric Evaluation and Treatment Clinic (Duke), Geriatric Evaluation Unit and Clinic (VA), Geriatric Consultation Services (VA, Duke), extended care and rehabilitation center (VA) and other nursing home facilities, interactions with community services, home assessment and other. Principles to be stressed are biology and pathophysiology of aging, multiple clinical problems in the elderly, interdisciplinary team approach to evaluation, planning and treatment, goals of maximal functional achievement and independence for the elderly. The student participates actively in the workup and management of

patients in inpatient extended care and outpatient settings to become more familiar with the problems of the elderly in the community. Familiarity with the growing literature in geriatric medicine is encouraged. The student participates in seminars, lectures and team meetings at the appropriate sites including the Duke Center for the Study of Aging. (3) Methods of Evaluation: Evaluation is by consensus of instructors and fellows at the various training sites. It is based on discussions and presentations throughout the course period. Prerequisites: approval of course director. Weight: 4 Max: 2. *Cohen and staff*

Microbiology

Professor Jack D. Keene, Ph.D. (Washington, 1974), *Chairman*.

Professors: Deepak Bastia, Ph.D. (Chicago, 1971); Dani P. Bolognesi, Ph.D. (Duke, 1967); Bryan R. Cullen, Ph.D. (New Jersey, 1984); Sharyn A. Endow, Ph.D. (Yale, 1975); Elwood Linney, Ph.D. (California-San Diego, 1973); Joseph R. Nevins, Ph.D. (Duke, 1976); Catherine M. Wilfert, M.D. (Harvard, 1962).

Adjunct Professors: H. Mario Geysen, Ph.D. (Melbourne, 1976); William Phelps, Ph.D. (Minnesota, 1985); Norman F. Weatherly, Ph.D. (Kansas, 1962).

Associate Professors: John D. Hamilton, M.D. (Colorado, 1964); Gale B. Hill, Ph.D. (Duke, 1966); Dolph Klein, Ph.D. (Rutgers, 1961); Kenneth N. Kreuzer, Ph.D. (Chicago, 1978); Thomas G. Mitchell, Ph.D. (Tulane, 1971); David J. Pickup, Ph.D. (Natl. Inst. For Med. Research, London, 1979); Kenneth H. Wilson, M.D. (North Carolina, 1974); Peter Zwadyk, Jr., Ph.D. (Iowa, 1971).

Associate Research Professors: Vickers Burdett, Ph.D. (Georgetown, 1973); Lizzie J. Harrell, Ph.D. (North Carolina State, 1978); Sara E. Miller, Ph.D. (Georgia, 1972).

Adjunct Associate Professor: Jeffrey J. Collins, Ph.D. (Harvard, 1972).

Assistant Professors: Mariano A. Garcia-Blanco, M.D., Ph.D. (Yale, 1984); Philip C. Hanna, Ph.D. (Pittsburgh, 1990); Jonathan M. Horowitz, Ph.D. (Wisconsin, 1985); John H. McCusker, Ph.D. (Brandeis, 1986); Ross E. McKinney, Jr., M.D. (Rochester, 1979); John R. Perfect, M.D. (Med. Coll. Ohio, 1974); Daniel J. Sexton, M.D. (Northwestern, 1971); Robin P. Wharton, Ph.D. (Harvard, 1986).

Assistant Research Professor: Barry S. Henderson, Ph.D. (Purdue, 1992).

Associate: Donald Komma, Ph.D. (Michigan, 1964).

Research Associates: Lucy G. Andrews, Ph.D.; Dragana Antic, Ph.D.; Kathleen Dudas, Ph.D.; Jim George, Ph.D.; Barbara Lipes, Ph.D.; Bidyut K. Mohanty, Ph.D.; Margaret S. Neece, Ph.D.; Sadashiva Pai, Ph.D.; Xiaoyan Y. Qian, Ph.D.; Gyantrakash Rai, Ph.D.; Pillariset Ratnakar, Ph.D.; Trilochan Sahoo, M.D.; Scott Tenenbaum, Ph.D.; Janice Watson, Ph.D.

Emeriti Chairman Wolfgang K. Joklik, D. Phil.; Suydam Osterhout, M.D., Ph.D.; Robert W. Wheat, Ph.D.; Hilda P. Willett, Ph.D.

Required Course

MIC-200B. Microbiology. The course in microbiology for medical students is given during the second semester of the first year. An intensive study is made of the common bacteria, viruses, fungi, and parasites that cause disease in humans. The didactic portion of the course focuses on the fundamental biology of micro-organisms causing disease and the molecular mechanisms of the microbial pathogenesis. Attention is given to the host-microbial relationship and the impact of the immune system and antimicrobial therapy on this interaction.

The laboratory portion of the course is designed to acquaint students with the basic techniques employed in the clinical microbiology laboratory, and to reinforce microbiological concepts. Medical case histories are presented by the clinical staff to correlate this course with patient care. Weight: 5. *Mitchell and staff*

Electives

MIC-252B. General Virology and Viral Oncology. The first half of the course is devoted to a discussion of the structure and replication of mammalian viruses. The second half deals specifically with tumor viruses which are discussed in terms of the virus-cell interaction, the relationship of virus infection to neoplasia, and the application of retroviruses in molecular and developmental biology. Permission of the instructors

is required. C-L: IMM-252B; Graduate School. Weight: 4 Min: 5. *Keene, Joklik, Bastia, Cullen, Nevins, and Pickup*

MIC-291B. Comprehensive Immunology. An intensive course in the biology of the immune system and the structure and function of its component parts. Major topics discussed are: properties of antigens; specificity of antibody molecules and their biologic functions; cells and organs of the lymphoid system; structure and function of complement; inflammation and non-specific effector mechanisms; cellular interactions and soluble mediators in lymphocyte activation, replication, and differentiation; regulation of immune responses, neoplasia and the immune system; molecular structure and genetic organization of immunoglobulins, histocompatibility antigens, and T cell receptors. C-L: IMM-291B; Graduate School. Weight: 4 Max: 10. *Krangel and staff*

MIC-308B. Clinical Microbiology - Immunology. A bench-training course in methods used in clinical microbiology stressing isolation and characterization of clinically significant microorganisms. Course conducted at the VA hospital microbiology laboratory. Prerequisites: Permission of instructor. Weight: 8 Max: 4. *Zwadyk*

MIC-330B. Medical Immunology. A brief review of basic concepts of immunology is followed by in-depth discussions of the role of immune mechanisms in the pathogenesis and treatment of human diseases. Principle emphasis is placed on immune deficiency diseases, hypersensitivity, alloimmunity, transplantation, infectious diseases, autoimmunity, tumor immunology, and immuno-hematology. When applicable the classes include patient presentations and laboratory demonstrations. C-L: IMM-330B; Graduate School. Weight: 5. *F. Ward and staff*

MIC-399B. Preceptorship in Microbiology. An individual reading and/or laboratory course in specialty areas supervised by an individual faculty member. Acceptance, nature of topic, and amount of credit by individual arrangement with proposed faculty member. Prerequisites: to be determined by instructor. Weight: 1-16. *Staff*

Molecular Cancer Biology

Professor of Biochemistry: Anthony R. Means, Ph.D. (Texas-Austin, 1966), *Chairman*.

Associate Professor: Patrick J. Casey, Ph.D. (Brandeis, 1986).

Assistant Professors: Mariano A. Garcia-Blanco, M.D. (Yale, 1984), Ph.D. (Yale, 1988); Stephen Garrett, Ph.D. (Johns Hopkins, 1986); Jonathan M. Horowitz, Ph.D. (Wisconsin, 1985); Katherine I. Swenson, Ph.D. (Washington, 1983).

Neurobiology

George Barth Geller Professor for Research in Neurobiology Dale Purves, M.D. (Harvard, 1964), *Chairman*.

Professors: Mohammed -Abou-Donia, Ph.D. (California-Berkeley, 1967); George J. Augustine, Ph.D. (Maryland, 1980); Dona M. Chikaraishi, Ph.D. (California-San Diego, 1973); Robert P. Erickson, Ph.D. (Brown, 1958); Owen Flanagan, Ph.D. (Boston, 1977); Warren G. Hall, Ph.D. (Johns Hopkins, 1975); William C. Hall, Ph.D. (Duke, 1967); Lawrence C. Katz, Ph.D. (California Instit. of Tech., 1984); David R. McClay, Ph.D. (North Carolina, 1971); James O. McNamara, M.D. (Michigan, 1968); J. Victor Nadler, Ph.D. (Yale, 1972); Allen D. Roses, M.D. (Pennsylvania, 1967); Sidney A. Simon, Ph.D. (Northwestern, 1973); Theodore Slotkin, Ph.D. (Rochester, 1970); George G. Somjen, M.D. (Amsterdam, 1956); John E.R. Staddon, Ph.D. (Harvard, 1964); Warren J. Strittmatter, M.D. (Duke, 1973); E. Lee Tyrey, Ph.D. (Illinois, 1969); David S. Warner, M.D. (Wisconsin, 1980).

Associate Professors: Rose-Mary Boustany, M.D. (Amer. Univ. Beirut, 1979); Nell B. Cant, Ph.D. (Michigan, 1973); Joseph M. Corless, M.D. (Duke, 1972), Ph.D. (Duke, 1971); David Fitzpatrick, Ph.D. (Duke, 1982); Darrell V. Lewis, M.D. (Minnesota, 1969); Roger D. Madison, Ph.D. (Duke, 1981); William D. Matthew, Ph.D. (California-San Francisco, 1981); Stephen Nowicki, Ph.D. (Cornell, 1985); Donald E. Schmechel, M.D. (Harvard, 1974); Rochelle D. Schwartz-Bloom, Ph.D. (Georgetown, 1983); J. H. Pate Skene, Ph.D. (Washington Univ., 1980); Dennis Turner, M.D. (Indiana, 1975); Fulton Wong, Ph.D. (Rockefeller, 1977).

Assistant Professors: Robert T. Freneau, Jr., Ph.D. (George Washington, 1985); Michael M. Haglund, Ph.D. (Washington, 1988); David A. Hosford, M.D. (Emory, 1983), Ph.D., (Emory, 1981); Julie A. Kauer, Ph.D. (Yale, 1986); Anthony S. LaMantia, Ph.D. (Yale, 1988); Donald C. Lo, Ph.D. (Yale, 1989); Richard D. Mooney, Ph.D. (California Inst. Tech., 1991); Miguel A. L. Nicolelis, M.D. (Sao Paulo, 1984), Ph.D. (Sao Paulo, 1988); Andrew S. Peterson, Ph.D. (Harvard, 1988); Peter H. Reinhart, Ph.D. (Australian Natl Univ., 1985).

Assistant Research Professor: Gillian Einstein, Ph.D. (Pennsylvania, 1984).

Emeriti: Irving T. Diamond, Ph.D. (Chicago, 1952); John W. Moore, Ph.D. (Virginia, 1945).

Required Course

NBI-202B. Basic Neurobiology. An intensive introduction to the structure and function of the mammalian nervous system designed specifically for first-year medical students. Lectures, laboratory exercises, clinical presentations and problem-solving conferences. Weight: 4. *Purves and staff*

Electives

NBI-208B. Neuronal Signaling: Ion Channels and Synapses. Basic principles of neural electrical activity. Areas of emphasis include action potential generation, ion channel structure/function relationships, modulation of channel activity, neurotransmitter secretion, transmitter receptors, and mechanisms of synaptic plasticity. Prerequisite: consent of instructors. C-L: Graduate School. Weight: 3 Max: 5. *Augustine, Kauer, Lo, and Reinhart*

NBI-209B. Systems Neurobiology. Structure and function of the mammalian sensory and motor systems, including their cognitive aspects. Prerequisite: consent of instructors. C-L: Graduate School. Weight: 3 Max: 5. *Cant, Fitzpatrick, Nicolelis, and Purves*

NBI-211B. Developmental Neurobiology. The development of the nervous system covering both the history and present status of the major issues in the field. Prerequisite: consent of instructors. C-L: Graduate School. Weight: 3 Max: 5. *Katz, LaMantia, Matthew, and Mooney*

NBI-212B. Molecular Neurobiology. The macromolecules responsible for the specialized functions of neurons and glia. Topics stress the biochemical, molecular, cellular, and genetic processes involved in the development and function of the mammalian nervous system. Introductory biochemistry is recommended. Prerequisite: consent of instructors. C-L: Graduate School. Weight: 3 Max: 5. *Chikaraishi, Skene, and Reinhart*

NBI-399B. Research in Neurobiology. Guided independent study and research experience in neurobiology. Nature of topic to be decided by individual arrangement with faculty advisor. Prerequisite: consent of faculty advisor. Weight: 1-16. *Staff*

Obstetrics and Gynecology

Professor: Charles B. Hammond, M.D., E. C. Hamblen Chair of Reproductive Biology and Family Planning, (Duke, 1961), *Chairman*.

Professors: Walter L. Thomas Professor W. Allen Addison, M.D. (Duke, 1960); James M. Ingram Professor Daniel L. Clarke-Pearson, M.D. (Case Western Reserve, 1975); Roy T. Parker Professor Arthur F. Haney, M.D. (Arizona, 1972); F. Bayerd Carter Professor William N.P. Herbert, M.D. (Bowman Gray, 1972); Gale B. Hill, Ph.D. (Duke, 1966); Allen P. Killam, M.D. (Texas, 1960); Stanley J. Robboy, M.D. (Michigan, 1965); David W. Schomberg, Ph.D. (Purdue, 1965); John T. Soper, M.D. (Iowa, 1978); E. Lee Tyrey, Ph.D. (Illinois, 1969).

Associate Professors: Andrew Berchuck, M.D. (Case Western Reserve, 1980); Richard C. Bump, M.D. (Ohio State, 1973); Marvin L. Hage, M.D. (Michigan, 1967); Claude L. Hughes, M.D., Ph.D. (Duke, 1980); Helen Kay, M.D. (Yale, 1979); Charles H. Livengood, III, M.D. (Duke, 1976); Lloyd F. Redick, M.D. (Ohio State, 1958); Patricia M. Saling, Ph.D. (Pennsylvania, 1979).

Associate Clinical Professor: Anna L. Stout, Ph.D. (South Carolina, 1980).

Assistant Professors: Nels C. Anderson, Ph.D. (Purdue, 1964); James D. Bowie, M.D. (Oklahoma, 1967); Grace M. Couchman, M.D. (Colorado, 1985); Geoffrey Cundiff, M.D. (Texas, 1989); Barbara Hertzberg, M.D. (Duke, 1980); Pamela L. Johnson, M.D. (Illinois, 1989); Elizabeth G. Livingston, M.D.

(Duke, 1984); Evan R. Myers, M.D. (Pennsylvania, 1988); Joanne T. Piscitelli, M.D. (Duke, 1980); Gustavo C. Rodriguez, M.D. (Illinois, 1985); David K. Walmer, M.D., Ph.D. (North Carolina, 1983); J. Brice Weinberg, M.D. (Arkansas, 1969).

Assistant Research Professor: Jon R. Wiener, Ph.D. (Virginia, 1984).

Assistant Clinical Professors: Jeffrey C. Andrews, M.D. (Toronto, 1983); Diana Dell, M.D. (Louisiana State, 1982); Richard J. Dane, M.D. (Georgetown, 1962); Stephen C. Gooding, M.D. (Bowman Gray, 1965); Joe W. Hardison, M.D. (North Carolina, 1965); Mary Lee Lobach, M.D. (Vanderbilt, 1984); David L. Richardson, Jr., M.D. (South Carolina, 1973).

Assistant Consulting Professors: James L. Allen, M.D. (Emory, 1965); Paul S. Andrews, M.D. (North Carolina, 1981); Arnold B. Barefoot, Jr., M.D. (North Carolina, 1982); Rudy W. Barker, M.D. (North Carolina, 1967); Mary K. Beckwith, M.D. (Iowa, 1982); Walker H. Campbell, M.D. (Virginia, 1963); Karen H. Clark, M.D. (Alabama, 1982); Vivian E. Clark, M.D. (Boston, 1981); David B. Crosland, M.D. (North Carolina, 1958); Yancey G. Culton, Jr., M.D. (Duke, 1956); Jerry L. Danford, M.D. (Duke, 1967); James R. Dingfelder, M.D. (Jefferson, 1965); Michael D. Fried, M.D. (New York, 1971); Carl A. Furr, Jr., M.D. (North Carolina, 1958); Francis S. Gardner, Jr., M.D. (Maryland, 1951); Michael D. Gooden, M.D. (North Carolina, 1973); Ronald E. Granger, M.D. (California-Irvine, 1977); William B. Gunter, Jr., M.D. (Emory, 1982); William D. Haithcock, M.D. (Med. Univ. South Carolina, 1973); Perry M. Harmon, M.D. (North Carolina, 1974); Charles O. Harris, M.D. (Duke, 1979); Bennet A. Hayes, Jr., M.D. (North Carolina, 1957); Melvin L. Henderson, M.D. (Duke, 1978); Wanda L. Jenkins, M.D. (Cincinnati, 1979); Clayton J. Jones, M.D. (Tennessee, 1952); Johnnie E. Jones, M.D. (Meharry, 1976); Glenward T. Keeney, M.D. (Med. Coll. Virginia, 1967); William R. Lambeth, M.D. (Bowman Gray, 1974); John W. Lane, M.D. (Duke, 1972); Richard E. Lassiter, M.D. (North Carolina, 1965); Stephen C. Lies, M.D. (Duke, 1976); Frank E. Long, M.D. (Maryland, 1975); Jack P. McDaniel, M.D. (North Carolina, 1956); Dudley C. Miller, M.D. (Missouri, 1959); James P. Moon, M.D. (South Dakota, 1979); William A. Nebel, M.D. (North Carolina, 1962); Phillip H. Pearce, M.D. (Duke, 1960); Marla M. Presta, M.D. (Chicago, 1982); Steven M. Scott, M.D. (Indiana, 1974); E. Frank Shavender, M.D. (North Carolina, 1968); W. Siegfried Smith, Jr., M.D. (Duke, 1961); Thomas A. Stokes, M.D. (Duke, 1955); Allen H. Van Dyke, Jr., M.D. (Bowman Gray, 1971); Paul A. Vieta, M.D. (New Jersey, 1966); Bertram E. Walls, M.D. (Duke, 1972); Robert K. Yowell, M.D. (Duke, 1961).

Research Associates: Deborah Burks, Ph.D. (Vanderbilt, 1990); Rosa Carballada, Ph.D. (Madrid, 1992); Lisette Leyton, Ph.D. (Univ. Chile, 1989); Claudia Tomez, Ph.D. (Univ. Buenos Aires, 1991).

Associates: Kimberly A. Boggess, M.D. (SUNY-Stony Brook, 1990); Mark R. Bush, M.D. (Georgetown, 1991); Michael E. Carney, M.D. (Loyola, 1990); Frank A. Cirisano, M.D. (Columbia, 1990); Kimberly W. Coates, M.D. (Texas A&M, 1991); Sharon L. Rupp, B.S., A.A.S.; Alison C. Weidner, M.D. (Duke, 1992).

Clinical Associates: Elizabeth J. Burkett, B.S.N., M.S.N.; Lorraine Fry-Mehlretter, M.S.; Rebecca M. Ryder, M.D. (North Carolina, 1989).

Consulting Associates: Kerry H. Ainsworth, M.D. (Northwestern, 1962); Avis A. Artis, M.D. (Duke, 1984); Linda K. Bresnahan, M.D. (Indiana, 1987); Pat C. Bryan, M.D. (North Carolina, 1983); Christie L. Clayton, M.D. (East Carolina, 1986); Cathryn L. Crosland, M.D. (Kentucky-Lexington, 1983); Gerianne Geszler, M.D. (Duke, 1985); Daniel L. Gottsegen, M.D. (Tufts, 1969); Stuart H. Jordan, M.D. (North Carolina, 1985); Glen A. Nowachek, M.D. (Loyola, 1982); Russel F. Palmeri, M.D. (Georgetown, 1980); Kathy A. Santoriello, M.D. (Duke, 1984); Ira Q. Smith, M.D. (Bowman Gray, 1979); Myron S. Strickland, Sr., M.D. (East Carolina, 1984); Camille J. Wahbeh, M.D. (Amer. Univ. Beirut, 1977).

Adjunct Assistant Professor: Neil J. Finkler, M.D. (Mount Sinai, 1982).

Professor Emeriti: Arthur C. Christakos, M.D.; Roy T. Parker, M.D.; Warren E. Patow, M.D.; Charles H. Peete, Jr., M.D.

Required Course

OBG-205C. Obstetrics and Gynecology. Required of all second-year students—consists of eight weeks in general obstetrics and gynecology. Students attend lectures, work daily in the general and special outpatient clinics, and are assigned patients on the obstetric and gynecologic wards. Students share in patient care, teaching exercises, and in daily tutorial sessions with the faculty. Clinical conferences, a gynecologic-pathology conference, endocrine conferences, and correlative seminars and lectures are included. Weight: 8. *Munoz*

Electives

OBG-210C. Gynecologic Cancer. This course presents a clinical experience in the management of patients with a gynecologic malignancy. The student assumes the role of an extern. Outpatient, inpatient, and operative exposure to these patients is extensive. Weight: 4 or 8 Max: 1. *Clarke-Pearson, Soper, Berchuck, Rodriquez and fellows on gynecologic oncology*

OBG-213C. Preparation for Practice, Cape Fear Valley Hospital, Fayetteville AHEC. This is a unique opportunity to receive both didactic exposure and clinical experience in obstetrics and gynecology in Cape Fear Valley Hospital, a large community hospital in Fayetteville, North Carolina, where almost 4,000 patients are delivered each year. A student actively participates in the care of patients in the labor and delivery room, assists at surgery, and renders postoperative care. This is a community hospital experience rather heavily weighted in clinical obstetrics. Students are exposed to a large volume of clinic opportunities. Three senior residents from Duke rotate through Cape Fear Valley Hospital. The students are directly supervised by three full-time Duke faculty at Cape Fear, in addition to Duke ob-gyn residents. Prerequisites: permission of Dr. Hammond prior to signing for the course. Check availability through Dr. Gooding's office. Weight: 4 Max: 1. *Hammond, Gooding, Richardson, Hardison, and staff of Cape Fear Valley Hospital*

OBG-231C. Clinical Reproductive Endocrinology and Infertility. Course for students who desire additional basic and clinical experience in examination, diagnosis, and treatment of obstetric and gynecologic patients with endocrinopathy and infertility. Course consists of clinical core of reproductive endocrine problems correlated with examination and treatment of patients both in the Endocrinology Outpatient Clinic, in surgery, and in the hospital. Exposure to assisted reproductive technologies is also available depending on the current clinical load. Permission of instructor required. Weight: 4 Max: 1. *Walmer, Couchman, Haney, Hammond, and reproductive endocrinology fellows*

OBG-239C. Perinatal Medicine. A study of the relationship of clinical factors during pregnancy, labor, delivery, and the first month of life. Emphasis is placed on abnormal conditions of pregnancy as related to the infant, prenatal pathological conditions adversely affecting the fetus and the newborn, and early management of the infant. Current problems in the maternal-fetal relationships are outlined. The clinical rotation consists of half-time on the high risk obstetric service and half on the nursery service. Duke North ICN or Duke North Nurseries. See also PED-225C. Prerequisites: must contact Dr. Hage prior to registration. Weight: 8 Max: 2. *Hage, Herbert, Killam, Kay, Livingston, and fellows in the maternal and fetal medicine division*

OBG-245C. Office Gynecology. For students preparing for non ob-gyn careers. Outpatient clinic diagnosis and patient care are taught. Weight: 4 or 8 Max: 1 *Munoz*

OBG-247C. Clinical Obstetrics. For students preparing for general practice of medicine, pediatrics, or obstetrics and gynecology. This course studies the relationship of clinical factors during pregnancy, labor, and delivery. Emphasis is placed on abnormal conditions of pregnancy as related to the infant. Current problems in the maternal-fetal relationship are outlined. The student functions on an intern level and takes part in activities of the housestaff and faculty. Weight: 5 or 10 Max: 2. *Hage, Herbert, Killam, Kay, Livingston, and fellows on obstetrical service*

OBG-249C. Clinical Gynecology and Urogynecology. For students preparing for obstetrics and gynecology, general practice, surgery, and urology. Emphasis is placed on the outpatient assessment of patients with acute and chronic gynecologic disorders including pelvic floor dysfunction, pelvic organ prolapse, urinary and fecal incontinence, and others. Students have the opportunity to work closely with faculty members in the Division of Gynecology. Inpatient care is not required, but participation in the operative care of gynecologic patients can be arranged if desired. Ample time for independent study is planned. The student is expected to utilize this time reviewing a specific clinical problem with frequent guidance and input from a member of the Gynecology Division with similar interests. Weight: 4 or 8 Max: 1. *Bump, Addison, Livengood, Cundiff, Weidner, and Coates*

OBG-253C. Preparation for Practice, Cabarrus Memorial Hospital, Concord, North Carolina. This is an opportunity to receive both didactic exposure and clinical exposure in obstetrics and gynecology in the community hospital. The student is expected to function as an intern. The student participates actively in the care of the patients in the labor and delivery area, assists at surgery, and renders postpartum and postoperative care. This is a community hospital experience rather heavily weighted in clinical obstetrics. The student is exposed to a large volume of clinical material. The practitioners in the community are all board certified obstetricians and gynecologists and are interested in student teaching. A Duke faculty person provides additional guidance by visits once per week. This elective can be taken for four weeks for four units or eight weeks for eight units. The students are housed in quarters available for them. Prerequisites: permission of Dr. Livengood prior to signing for the course. Weight: 4, 6, or 8 Max: 1. *Livengood and staff of the Cabarrus Memorial Hospital*

Ophthalmology

Joseph A. C. Wadsworth Clinical Professor of Ophthalmology David L. Epstein, M.D. (Johns Hopkins, 1968), *Chairman*.

Professors: W. Banks Anderson, Jr., M.D. (Harvard, 1956); Edward G. Buckley, M.D. (Duke 1977); Jonathan G. Dutton, M.D. (Washington, 1977), Ph.D. (Harvard, 1970); Diane Van Horn Hatchell, Ph.D. (Marquette, 1968); Joseph A. C. Wadsworth Research Professor of Ophthalmology Gordon K. Klintworth, M.D., Ph.D. (Witwatersrand, 1957, 1966); Helena Rubinstein Foundation Professor of Ophthalmology Robert Machemer, M.D. (Freiburg, 1959); Brooks W. McCuen II, M.D. (Columbia, 1974).

Associate Professors: Tereté Borrás, Ph.D. (Madrid, 1977); Alan Carlson, M.D. (Duke, 1981); Glenn J. Jaffe, M.D. (California-San Francisco, 1983); Stephen C. Pollock, M.D. (Illinois, 1981); Alan D. Proia, M.D. (Cornell, 1980), Ph.D. (Rockefeller, 1979); Fulton Wong, Ph.D. (Rockefeller, 1977).

Associate Clinical Professor: Judy H. Seaber, Ph.D. (Duke, 1985).

Assistant Professors: R. Rand Allingham, M.D. (Cincinnati, 1979); Joseph Corless, M.D., Ph.D. (Duke, 1972); Monica A. De La Paz, M.D. (Stanford, 1987); Craig Fowler, M.D. (Med. Coll. Virginia, 1985); Sharon F. Freedman, M.D. (Harvard, 1985); Leon W. Herndon, Jr., M.D. (North Carolina, 1991); Peter C. Huttemeier, M.D. (Copenhagen, 1977); Angela Royster Scott, M.D. (North Carolina, 1990); Cynthia Toth, M.D. (Med. Coll. Pennsylvania, 1983).

Assistant Clinical Professor: Calvin H. Mitchell, M.D. (Duke, 1958).

Assistant Research Professors: E. Timothy O'Brien, Ph.D. (California-Santa Barbara, 1986); Margaret Pericak-Vance, Ph.D. (Indiana, 1978); Joel R. Ross, Ph.D. (Texas-Southwestern, 1991).

Associate Consulting Professors: Edward K. Isbey, Jr., M.D. (Michigan, 1955); Lawrence W. Moore, Jr., M.D. (Duke, 1963).

Assistant Consulting Professors: David P. Berry, M.D. (South Carolina, 1975); John E. Bourgeois, M.D. (Virginia, 1979); David J. Browning, M.D. (Duke, 1981) Ph.D. (Duke, 1980); Terry A. Cox, M.D. (Kansas, 1975); Anne Marie Hanneken, M.D. (Med. Coll. Wisconsin, 1984); Edward K. Isbey III, M.D. (North Carolina, 1981); Jeremiah R. Marion, M.D. (Duke, 1975); Walter C. McLean, Jr., M.D. (Virginia 1975); Charles F. Sydnor, M.D. (Virginia, 1969).

Consulting Associates: Thomas L. Beardsley, M.D. (Duke, 1971); J. Thomas Foster, M.D. (Duke, 1958); William R. Harris, M.D. (North Carolina, 1956); Ann Kathryn Joslyn, M.D. (Duke, 1983); John H. Killian, M.D. (Bowman Gray, 1967); Martin J. Kreshon, M.D. (Marquette, 1954); W. Hampton Lefler, M.D. (Bowman Gray, 1963); Harold E. Shaw, Jr., M.D. (Med. Univ. South Carolina, 1973); Robert E. Wiggins, M.D. (North Carolina, 1984).

Emeritus: Joseph A. C. Wadsworth, M.D.

Electives

OPH-210C. Medical Ophthalmology. The ophthalmic signs and symptoms of systemic disease are presented in a lecture series. Oriented for those students interested primarily in pediatrics, internal medicine, or ophthalmology. If permitted by the instructor, this clinical science course can be audited. Weight: 1 Min: 6 Max: 20. *Allingham and Mitchell*

OPH-212C. General Ophthalmology. A clinical preceptorship in which the student participates and observes the regular housestaff activities, conferences, lectures, patient care, and treatment including surgery. Emphasis on the use of specialized ophthalmic

apparatus is emphasized. Prerequisites: OPH-210C recommended, but not required. Weight: 4 or 8 Max: 2. *Allingham*

OPH-213C. Ophthalmic Pathology. The student reviews all ophthalmic pathology specimens submitted and any pertinent permanent specimens. He or she attends all regular ongoing ophthalmic pathology conferences. Prerequisites: OPH-212C and OPH-210C recommended, but not required. Not available during the summer term. Weight: 1. *Klintworth and Proia*

OPH-214C. Investigative Ophthalmology. The student is assigned a project relating to basic ophthalmologic problems. Technical assistance, sufficient equipment, and laboratory animals are supplied for the completion of the project. The student is expected to attend all scheduled research seminars. Prerequisites: OPH-212C and OPH-210C suggested, but not required. Students must devote at least three months to the elective. Weight: 4 or 8 Max: 2. *Klintworth, Hatchell, Wong, Proia, Jaffe, Epstein, DeLaPaz, Fowler, and Borrás*

OPH-215C. Pediatric Ophthalmology. A clinical preceptorship in which the student participates in an outpatient pediatric ophthalmology clinic. The student encounters the more common ocular disorders of childhood including ocular motility disturbances, congenital disorders, and congenital metabolic disorders. The diagnosis and treatment aspects are emphasized heavily. The course meets on Tuesdays or Thursdays from 9:00 a.m. till 4:00 p.m. or by special arrangement, such as a half day Tuesday and a half day Thursday. Additional experiences, which would include surgery and/or pediatric neuro-ophthalmology, can be arranged. Weight: 1 or 2 Max: 3. *Buckley, Seaber, and Freedman*

OPH-216C. Clinical Neuro-Ophthalmology. An advanced clinical preceptorship that provides students with exposure to a variety of neuro-ophthalmologic problems, including diseases affecting the optic nerve and central visual pathways and disorders of eye movement. Emphasis is placed on history taking, acquisition of specialized examination techniques (visual fields, pupils, ocular motility and fundus), and the logical analysis of clinical information. The course meets one day per week, either on Tuesday or Thursday and begins at 8:30 a.m. Prerequisites: OPH-212C. Weight: 1 Max: 1. *Pollock*

Pathology

Professor: Salvatore Pizzo, M.D. (Duke, 1972), Ph.D. (Duke, 1973), *Chairman*.

Professors: Darell D. Bigner, M.D., Ph.D. (Duke, 1965, 1971); Sandra H. Bigner, M.D. (Tennessee, 1971); Edward H. Bossen, M.D. (Duke, 1965); William D. Bradford, M.D. (Western Reserve, 1958); James B. Duke Professor Robert B. Jennings, M.D. (Northwestern, 1950); William W. Johnston, M.D. (Duke, 1959); Gordon K. Klintworth, M.D., Ph.D. (Witwatersrand, 1957, 1966); Lester Layfield, M.D. (California-Los Angeles, 1979); Keith A. Reimer, M.D. (Northwestern, 1972); L. Barth Reller, M.D. (Virginia, 1966); Stanley J. Robboy, M.D. (California-Los Angeles, 1965); Victor L. Roggli, M.D. (Baylor, 1976); John D. Shelburne, M.D., Ph.D. (Duke, 1972, 1971).

Adjunct Professors: Paul Nettesheim, M.D., D.M.S. (Born, 1959); Vladimir Petrow, Ph.D., D.Sc. (London, 1936, 1942); Nicholas Vick, M.D. (Chicago, 1965).

Associate Professors: James D. Crapo, M.D. (Rochester, 1971); Marcia Gottfried, M.D. (Northwestern, 1978); Maureane Hoffman, M.D., Ph.D. (Iowa, 1982); Peter D. Issitt, Ph.D. (Columbia Pacific, 1987); Alan D. Proia, M.D. (Cornell, 1980), Ph.D. (Rockefeller, 1979); Christopher Shea, M.D. (Georgetown, 1983); Charles Steenbergen, M.D., Ph.D. (Pennsylvania, 1978, 1979); John Toffaletti, Ph.D. (North Carolina, 1977); Frances King Widmann, M.D. (Case Western Reserve, 1960); Peter Zwadyk, Jr., Ph.D. (Iowa, 1971).

Clinical Associate Professor: Emily A. G. Reisner, Ph.D. (Case Western Reserve, 1969).

Associate Research Professors: George Cianciolo, Ph.D. (Miami, 1977); Carol W. Lewis, Ph.D. (North Carolina, 1972).

Assistant Professors: Rex Bentley, M.D. (Harvard, 1986); Scott Berkowitz, M.D. (Jefferson, 1979); Steven J. Bredehoeft, M.D. (Kansas, 1974); Kenneth Copeland, Ph.D. (Manitoba, 1991); Mark W. Dewhirst, D.V.M., Ph.D. (Colorado State, 1975, 1979); Leslie Dodd, M.D. (Nevada, 1987); Jan Enghild, Ph.D. (Univ. Aarhus, Denmark, 1987); Henry S. Friedman, M.D. (SUNY-Syracuse, 1977); Herbert Fuchs, M.D., Ph.D.

(Duke, 1984); Charles S. Greenberg, M.D. (Hahnemann, 1976); John Guyton, M.D. (Harvard, 1973); Laura P. Hale, M.D., Ph.D. (Duke, 1990, 1991); Lizzie Harrell, M.D. (North Carolina State, 1987); John M. Harrelson, M.D. (Duke, 1965); David Howell, M.D., Ph.D. (Duke, 1984, 1982); Christine M. Hulette, M.D. (Louisville, 1983); Randy H. Jirtle, Ph.D. (Wisconsin, 1976); William Kane, M.D., Ph.D. (Washington Univ., 1982); Virginia Kraus, M.D., Ph.D. (Duke, 1982, 1993); Hannah Krigman, M.D. (North Carolina, 1988); Joanne Kurtzberg, M.D. (New York Med. Coll. 1976); James G. Lewis, Ph.D. (Duke, 1982); James E. Lowe, M.D. (California-Los Angeles, 1973); Kim Lyerly, M.D. (California-Los Angeles, 1983); John F. Madden, M.D., Ph.D. (Duke, 1989); Karen Mann, M.D., Ph.D. (Tufts, 1988); Roger C. McLendon, M.D. (Med. Coll. Georgia, 1982); Sara Miller, Ph.D. (Georgia, 1972); Thomas Ortel, M.D., Ph.D. (Indiana, 1985, 1983); Victor G. Prieto, M.D. (Alicante, Spain, 1986), Ph.D. (Barcelona, 1991); L. Darryl Quarles, M.D. (Alabama, 1979); Mazin B. Qumsiyeh, Ph. D. (Texas Tech, 1986); Jonathan I. Scheinman, M.D. (Illinois, 1966); Daniel I. Schenckman, D.V.M. (Purdue, 1979), Ph.D. (Wisconsin, 1986); Marilyn Telen, M.D. (New York Univ., 1977); Philip J. Walther, M.D., Ph.D. (Duke, 1975, 1974); Michael R. Zalutsky, Ph.D. (Washington Univ., 1974).

Assistant Clinical Professors: John A. Bittikofer, Ph.D. (Purdue, 1971); Jane Gaede, M.D. (Duke, 1966); Robert B. Kinney, M.D. (Duke, 1981); Richard J. Rahija, D.V.M. (Kansas, 1974), Ph.D. (North Carolina, 1989); Margaret C. Schmidt, M.A. (Louisville, 1969), Ed.D. (Duke, 1988); Frank A. Sedor, Ph.D. (Florida, 1971); Robin T. Vollmer, M.D. (Duke, 1967); Cynthia Wells, M.Ed., D.Ed. (Duke, 1978, 1984).

Assistant Research Professors: Gerald E. Archer, Jr., Ph.D. (Cincinnati, 1987); Mario Gonzalez-Gronow, D.Sc. (Chile, 1970); Uma K. Misra, Ph.D. (Kansas State, 1958); B. K. Ahmed Rasheed, Ph.D. (Indian Instit. Sci., 1981).

Adjunct Assistant Professors: John Butts, M.D. (Duke, 1972); Thomas B. Clark III, M.D. (Med. Univ. South Carolina, 1983); Lynn Crook, M.D. (Med. Univ. South Carolina, 1974) Ph.D. (Emory, 1966); Arthur Davis, M.D. (Minnesota, 1953); Jochen Fischer, Ph.D. (Stuttgart, 1993); Peter Ingram, Ph.D. (Southampton, 1967); Myla Lai-Goldman, M.D. (Columbia, 1983); Richard M. Levenson, M.D. (Michigan, 1979); Gail Macik, M.D. (Texas Health Sci. Ctr., 1983); James Alan Popp, D.V.M. (Ohio State, 1968), Ph.D. (California-Los Angeles, 1972); Jerry E. Squires, M.D. (West Virginia, 1974), Ph.D. (Yale, 1971); Peter Wentz, Ph.D. (Florida, 1972).

Associate: Kenneth R. Broda, Ph.D. (Duke, 1977).

Emeriti: Bernard F. Fetter, M.D.; John A. Koepke, M.D.; Phillip C. Pratt, M.D.; Kenneth A. Schneider, M.D.; Joachim R. Sommer, M.D.; F. Stephen Vogel, M.D.; Benjamin Wittels, M.D.

Required Course

PTH-200C. Pathology. The core course in pathology is given during the second term of the first year. Fundamentals of pathology are presented by correlating gross and microscopic material to illustrate the structural changes in disease. Lectures dealing with broad concepts of disease processes are presented by senior faculty, and conferences with small groups of students are held under the guidance of staff members. Etiology and pathogenesis of disease, as well as the experimental approach are emphasized for the purpose of correlation with clinical disease. In addition to group work, conferences are scheduled to discuss problems derived from autopsies. Students are required to collaborate in postmortem studies and present cases in clinical-pathologic conferences under the direction of the staff. Weight: 5. *Steenbergen*

Electives

PTH-223B or C. Autopsy Pathology. The course is intended to introduce students to the autopsy as an investigative tool. Anatomic-clinical correlation is emphasized. Students work directly with one or more members of the pathology department. They first assist at autopsies and then perform autopsies under supervision. They work up these cases with particular attention to correlations with clinical and experimental medicine, prepare the final autopsy reports, and work essentially at the level of a house officer. Students are expected to present their findings at staff conferences. Preference given to Pathology Study Program students. Weight: 4 or 8 Max: 2. *Proia*

PTH-227B. Molecular Pathology. This course is designed to provide exposure to the basic molecular biologic techniques that are used in the diagnosis and characterization of inherited diseases and human tumors, with an emphasis on leukemia and lymphoma. The student will spend the majority of time at the bench in the Molecular Diagnostic Laboratory, first extracting nucleic acids and then performing southern blot and polymerase chain reaction studies on patients samples. The results of these studies

will be correlated with both clinical and histopathologic findings to learn the utility and limitations of molecular biologic analysis in the assessment of human disease. Prerequisites: Permission of instructor. Weight: 4 Max: 2. *Traweek*

PTH-241B. Pathologic Basis of Clinical Medicine. This is a lecture course stressing clinicopathologic correlation, morphologic diagnosis, pathophysiology, and laboratory medicine. It is required for students enrolled in the Pathology Study Program, but is available as a separate elective for all students. Lectures are on Thursday 8:00 - 9:30 a.m. and Friday 12:00 - 1:00 p.m. Course must be taken for the entire year. No audits are allowed. Weight: 1. *Bradford, Reimer, and Hoffman*

PTH-242C. Laboratory Basis of Clinical Medicine. This is an intensive four week lecture / demonstration experience in basic and practical aspects of diagnostic laboratory medicine. Clinically relevant aspects of immunology, hematopathology, virology, chemistry, transfusion medicine, and molecular diagnostics directly related to patient testing are presented and discussed by a multidisciplinary faculty. Information gained in this course is useful to all physicians who care for patients and who use a hospital laboratory. Although geared to trainees in laboratory medicine this course prepares the medical student in the discriminating use of the modern hospital laboratory. Prerequisites: permission of Dr. Bradford. Weight: 4 Max: 8. *Madden*

PTH-281B or C. Cytopathology Preceptorship. This course consists of full-time rotation in the diagnostic cytopathology laboratories. By working with the laboratory staff, the student explores in detail the role played by diagnostic cytopathology in the diagnosis of disease. In addition to general cytology, the student has the opportunity to participate in the fine needle aspiration biopsy service. Although not a requirement, the student is encouraged to pursue special research projects. Preference given to Pathology Study Program students. Weight: 4 or 8 Max: 1. *Johnston, Bigner, Layfield, Dodd, and cytopathology staff*

PTH-342B. Special Topics in Pathology. Special problems in pathology are studied with a member of the senior staff. The subject matter is individually arranged. Permission of the instructor required. Weight: 1-16. *Pizzo and staff*

PTH-348B or C. Practical Surgical Pathology. This course serves as an apprenticeship in which the student works closely with residents in the actual preparation and diagnosis of tissue changes. Microscope required (limited number available on loan). Prerequisites: permission of Dr. Bradford. Preference given to Pathology Study Program students. Weight: 4 or 8 Max: 2. *Layfield and staff*

PTH-350B or C. Medical Microbiology. This is an introduction to medical microbiology (CMB) including appropriate use of diagnostic tests and other laboratory resources for patient care and hospital infection control. The student participates in laboratory rounds with the faculty and trainee and the infectious diseases services. The student gains appropriate bench experience in all CMB disciplines including the use of molecular biology methods used in patient related tests and infection control investigations. Weight: 4 Max: 1. *Reller, Gruninger, Harrell, Madden, and staff*

PTH-353B. Neuropathology. A view of neuropathology that emphasizes clinicopathologic correlation. Weight: 3. *McLendon and staff*

PTH-359B. Fundamentals of Electron Microscopy. Emphasis is placed on the theory and application of electron microscopy to ultrastructural pathology. The methods relating to electron microscopy as well as x-ray microanalysis, ion microscopy, and immunocytochemistry are considered. Laboratory experience is included. Weight: 3. *Shelburne, Sommer, Ingram, and LeFurgey*

PTH-364B. Skeletal Pathology. An overview of skeletal pathology beginning with the development of the normal skeleton. a systematic review of inflammatory, neoplastic, metabolic, arthritic, vascular, dysplastic, and traumatic diseases of the skeleton. Clinical correlation. Weight: 2 Min: 4 Max: 10. *Harrelson*

PTH-366B. Pulmonary Pathology and Pathophysiology. Emphasis is on pulmonary pathology and pathophysiology of infections, metabolic, environmental, neoplastic diseases, and certain diseases of unknown etiology (sarcoid, alveolar proteinosis, e.g.). Weight: 3 Min: 2 Max: 15. *Roggli*

PTH-380B or C. Surgical Pathology—Emphasis: Electron Microscopy. This course is an apprenticeship in which the student becomes engaged in the actual preparation and diagnosis of tissue changes using both light and electron microscopy. The student, of necessity, learns how to operate the electron microscope. Prerequisites: PTH-359B suggested, but not required. Permission of instructor is required. Weight: 4 or 8 Max: 1. *Shelburne and Vollmer*

Pediatrics

Samuel L. Katz Professor Michael M. Frank, M.D. (Harvard, 1960), *Chairman.*

Professors: Page A. W. Anderson, M.D. (Duke, 1963); George Bisset, III, M.D. (South Florida, 1975); James B. Sidbury Professor Rebecca H. Buckley, M.D. (North Carolina, 1958); Y.T. Chen, M.D. (Taiwan Univ., 1973), Ph.D. (Columbia, 1978); John M. Falletta, M.D. (Kansas, 1966); John W. Foreman, M.D. (Maryland, 1973); Henry S. Friedman, M.D. (SUNY-Syracuse, 1977); Herman Grossman, M.D. (Columbia, 1953); Wilburt C. Davison Professor Samuel L. Katz, M.D. (Harvard, 1952); Thomas R. Kinney, M.D. (Duke, 1970); Joanne Kurtzberg, M.D. (New York Med. Coll., 1976); Keith T. Oldham, M.D. (Med. Coll. Virginia, 1976); Jeffrey L. Platt, M.D. (Southern California, 1977); Stephen P. Sanders, M.D. (Louisville, 1975); Alexander Spock, M.D. (Maryland, 1955); William R. Treem, M.D. (Stanford, 1977).

Clinical Professors: Norman S. Talner, M.D. (Michigan, 1949); W. Samuel Yancy, M.D. (Duke, 1965).

Associate Professors: Brenda E. Armstrong, M.D. (St. Louis, 1974); Roger C. Barr, Ph.D. (Duke, 1968); Rose-Mary Boustany, M.D. (Amer. Univ. Beirut, 1979); Edward G. Buckley, M.D. (Duke, 1977); Dennis A. Clements, M.D. (Rochester, 1973), M.P.H., Ph.D. (North Carolina, 1988, 1990); G. Robert DeLong, M.D. (Harvard, 1961); Peter C. English, M.D., Ph.D. (Duke, 1975); Michael S. Freemerk, M.D. (Duke, 1976); Laura T. Gutman, M.D. (Stanford, 1962); Edward Halperin, M.D. (Yale, 1979); Frank Kern, M.D. (Pennsylvania, 1982); Allen P. Killam, M.D. (Texas-Galveston, 1960); Lowell R. King, M.D. (Johns Hopkins, 1956); Darrell V. Lewis, Jr., M.D. (Minnesota, 1969); John G. Looney, M.D. (Texas-Southwestern, 1969); Ross E. McKinney, Jr., M.D. (Rochester, 1979); Jon N. Meliones, M.D. (Tufts, 1984); Thomas M. Murphy, M.D. (Rochester, 1973); Martin P. O'Laughlin, M.D. (Columbia, 1980); Neil Prose, M.D. (New York Univ., 1975); Philip M. Rosoff, M.D. (Western Reserve, 1978); David T.H. Tanaka, M.D. (Johns Hopkins, 1979); Ross M. Ungerleider, M.D. (Rush, 1977); Russell E. Ware, M.D., Ph.D. (Duke, 1983, 1991); Jo Rae Wright, Ph.D. (West Virginia, 1981).

Associate Clinical Professors: Stephen G. Kahler, M.D. (Duke, 1973); Deborah W. Kredich, M.D. (Michigan, 1962); Mary Ann Morris, M.D. (Arkansas, 1972); Lois A. Pounds, M.D. (Pittsburgh, 1965); Gordon Worley, M.D. (Harvard, 1973).

Associate Research Professor: David S. Millington, Ph.D. (Liverpool, 1969).

Assistant Professors: Denise M. Adams, M.D. (Georgetown, 1988); Kenneth A. Alexander, M.D. (Washington, 1989); Andrea Amalfitano, D.O. (Michigan State, 1990), Ph.D. (Michigan State, 1989); Richard Auten, M.D. (North Carolina, 1981); A. Resai Bengur, M.D. (Med. Univ. South Carolina, 1982); William D. Bradford, M.D. (Western Reserve, 1958); Iley B. Browning III, M.D. (North Carolina, 1982); Emil Chuang, M.D. (Sydney, 1983); Ghassan S. Dbaibo, M.D. (Amer. Univ. Beirut, 1986); Sharon Freedman, M.D. (Harvard, 1985); Herbert E. Fuchs, M.D., Ph.D. (Duke, 1984); Ricki F. Goldstein, M.D. (Cornell, 1981); Eva Nozik Grayck, M.D. (Colorado-Boulder, 1988); Terry O. Harville, M.D., Ph.D. (Florida, 1986, 1982); J. Rene Herlong, M.D. (Duke, 1989); J. David Jones, M.D. (Duke, 1954); Ronald J. Kanter, M.D. (Vanderbilt, 1979); Mary J. Laughlin, M.D. (SUNY-Buffalo, 1988); Jennifer Li, M.D. (Duke, 1987); Darryl C. Longee, M.D. (Arkansas, 1983); Samuel M. Mahaffey, M.D. (West Virginia, 1979); J. Marc Majure, M.D. (Mississippi, 1981); M. Louise Markert, M.D., Ph.D. (Duke, 1982, 1981); Paul L. Martin, M.D., Ph.D. (Washington, 1987); J. Clarke McIntosh, M.D. (Med. Univ. South Carolina, 1981); Cindy Miller, M.D. (George Washington, 1985); Richard P. Morse, M.D. (Dartmouth, 1987); Karen J. O'Donnell, Ph.D. (North Carolina, 1983); Janice Olson, M.D. (Utah, 1985); Shirley K. Osterhout, M.D. (Duke, 1957); Mazin Qumsiyeh, Ph.D. (Texas Tech, 1986); M. Henderson Rourke, Jr., M.D. (Pennsylvania, 1963); Laura E. Schanberg, M.D. (Duke, 1984); Scott Schulman, M.D. (George Washington, 1982); Deborah L. Squire, M.D. (Northwestern, 1978); Robert J. Thompson, Jr., Ph.D. (North Dakota, 1971); Johan L. K. Van Hove,

M.D. (Katholieke Univ., Belgium, 1986); Judith A. Voynow, M.D. (Pennsylvania, 1982); Emmanuel B. Walter, M.D. (Maryland, 1983); Delbert Wigfall, M.D. (Emory, 1979); Larry Williams, M.D. (Duke 1977).

Assistant Clinical Professors: Jeffrey Baker, M.D. (Duke, 1984); Robert P. Drucker, M.D. (Duke, 1979); Nancy E. Friedman, M.D. (Med. Coll. Virginia, 1975); Karen H. Frush, M.D. (Duke, 1986); Martha Ann Keels, D.D.S., Ph.D. (North Carolina, 1984, 1990); Ave Maria Lachiewicz, M.D. (Minnesota, 1980); Elizabeth A. Landolfo, M.D. (Manitoba, 1988); Beatriz Morris, M.D. (Puerto Rico, 1988); John W. Moses, M.D. (Med. Univ. South Carolina, 1983); Rupa Redding-Lallinger, M.D. (Cornell, 1980); Christine Rudd, Pharm.D. (North Carolina, 1973); Gail Spiridigliozzi, Ph.D. (Kansas, 1988); Marjorie E. Tripp, M.D. (Yale, 1973).

Assistant Research Professors: Donald Chace, Ph.D. (George Washington, 1989); Michael D. Feezor, Ph.D. (North Carolina, 1969); J. Francis Heidlage, Ph.D. (Missouri, 1978); Nancy G. Henshaw, M.P.H., Ph.D. (North Carolina, 1981, 1983); Stewart P. Johnson, Ph.D. (Case Western Reserve, 1983); Keesoo Lee, Ph.D. (Georgia, 1994).

Associates: David M. Ashley, M.B.B.S. (Monash Univ., Melbourne, 1986); Krystal S. Bottom, M.D. (Florida, 1989); Ira M. Cheifetz, M.D. (Yale, 1989); Cheryl Jackson, M.D. (Pennsylvania, 1987); Cynthia R. Jackson, D.O. (Osteopathic Med., Iowa, 1989); Priya Kishnani, M.D., B.S. (Bombay, 1985); Jennifer Lawson, M.D. (Vermont, 1990); L. Scott Levin, M.D. (Temple, 1982); Jeffrey H. Moreadith, M.D. (Duke, 1992); Melinda L. O'Leary, M.D. (Vanderbilt, 1992); Maria A. Pane, M.D. (UNMDNJ, 1989); Jyoti P. Ramakrishna, M.D. (Lady Hardinge Med. Coll., New Delhi, 1988); Roberts H. A. Smith, M.D. (Texas-Houston, 1990); Karen K. St. Claire, M.D. (Texas-Galveston, 1982); Denise C. Wilczynski, M.D. (Vermont, 1991).

Clinical Associates: Adegboyega O. Aderibigbe, M.D. (Univ. Ife, Nigeria, 1983); Joanne Barton, Dr.P.H. (North Carolina), 1990; Muki W. Fairchild, M.S.W. (North Carolina, 1976); Robert Fitch, M.D. (Duke, 1976); Kathryn E. Gustafson, Ph.D. (Ohio, 1988); Allyn McConkie-Rosell, M.S.W. (Arkansas, 1980); Marcia Morgenlander, M.D. (Pittsburgh, 1988); William H. Schultz, P.A. (Duke, 1981); A. William Taub, M.S.W. (North Carolina, 1981).

Research Associates: Ulus Atasoy, M.D. (Minnesota, 1984); Pasquale Chitano, Ph.D. (Milan, 1992); Thomas L. Dawson, Ph.D. (North Carolina, 1994); Qing Dong, M.D. (Tongji Med. Univ., Wuhan, PR China, 1983) Ph.D. (Loyola, 1993); Hui-Ming Liu, M.D. (Norman Bethune Univ., 1978); Rashid N. Nassar, Ph.D. (Duke, 1974); Mark F. Pennybacker, Ph.D. (North Carolina, 1992); Kasturi L. Puranam, Ph.D. (Indian Inst. Sci., 1988); Jianjun Shen, Ph.D. (Rutgers, 1992); Robert D. Stevens, Ph.D. (London, 1969); Ronald F. Thomas, Ph.D. (Miami, 1973); Eric Wagner, Ph.D. (Laval, 1994); Jer-Yuarn Wu, M.D., Ph.D. (Duke, 1985); Helen Yang, M.D. (Henan Med. Coll., 1990).

Consulting Professors: Thomas K. Oliver, Jr., M.D. (Harvard, 1949); James A. Stockman III, M.D. (Jefferson, 1969).

Associate Consulting Professors: Rosalind Coleman, M.D. (Case Western Reserve, 1969); William L. London, M.D. (North Carolina, 1955); Howard H. Loughlin, M.D. (Pennsylvania, 1970); Evelyn Schmidt, M.D. (Duke, 1951), M.P.H. (Columbia, 1962).

Assistant Consulting Professors: Clarence A. Bailey, M.D. (North Carolina, 1958); William L. Coleman, M.D. (New Mexico, 1979); James S. Hall, Jr., M.D. (Duke, 1957); Alvin H. Hartness, M.D. (Bowman Gray, 1965); Thomas M. McCutchen, Jr., M.D. (Vanderbilt, 1963); Kathy A. Merritt, M.D. (Duke, 1985); Charles B. Neal III, M.D. (Duke, 1955); John C. Pollard, M.D. (Virginia, 1968); William C. Powell, M.D. (Bowman Gray, 1952); Ann Reed, M.D. (Med. Coll. Ohio, 1984); James B. Rouse, M.D. (Duke, 1965); Frank S. Shaw, M.D. (Pennsylvania, 1959); Charles I. Sheaffer, M.D. (Western Reserve, 1958); Leonard D. Stein, M.D. (Med. Coll. Georgia, 1975); J. Gordon Still, M.D. (Bowman Gray, 1978), Ph.D. (Wake Forest, 1978); Fred R. Stowe, Jr., M.D. (North Carolina, 1958).

Consulting Associates: Lillis F. Altshuller, M.D. (Western Reserve, 1954); Vandana Bhide, M.D. (Wisconsin, 1991); Carol A. Burk, M.D. (Pittsburgh, 1983); R. Meade Christian, Jr., M.D. (Western Reserve, 1967); Douglas W. Clark, M.D. (North Carolina, 1983); William G. Conley III, M.D. (Med. Coll. Virginia, 1960); Jean M. Findlay, M.B., Ch.B. (Aberdeen, Scotland, 1970); Gregory A. Fisher, M.D. (South Florida, 1976); Martha E. Gagliano, M.D. (Duke, 1982); Keith Gallaher, M.D. (Pennsylvania State, 1982); William M. Gay, M.D. (Eastern Virginia, 1980); James W. Grant, M.D. (Duke, 1979); Larry C. Harris, M.D. (Duke, 1977); Rufus McP. Herring, Jr., M.D. (Bowman Gray, 1969); Sandra Hosford, M.D. (Duke, 1986); Jennifer L. Lail, M.D. (Kentucky, 1978); Charles W. Lallier, M.D. (Virginia, 1981); Pierre C. LeMaster, M.D. (Florida, 1971); Donald N. Ludlow, Jr., M.D. (Hahnemann, 1983); Ashok B. Mehta, M.D. (Baroda Med. Coll., India, 1974); William R. Purcell, M.D. (North Carolina, 1956); Janice D. Stratton, M.D. (Tulane, 1961); Charles A. Trant, Jr., M.D. (East Carolina, 1989); Susan Wang, M.D., M.P.H. (Columbia, 1991); Joseph W. Whatley, M.D. (Duke, 1958); James C. Womble, M.D. (North Carolina, 1986).

Emeriti: Edmond C. Bloch, M.B.; William Cleland, M.D.; Susan C. Dees, M.D.; Thomas E. Frothingham, M.D.; Jerome S. Harris, M.D.; Madison S. Spach, M.D.; Bailey D. Webb, M.D.; Catherine M. Wilfert, M.D.

Required Course

PED-205C. Pediatrics. The basic course in pediatrics for all students is an eight-week clerkship in the second year. Its principal aim is to provide an exposure to the field

of child health. The student has a varying series of experiences which should give a grasp of the concepts that underlie the discipline. Goals should be to acquire familiarity and competence with the basic tools of information-gathering (history, physical examination, and laboratory data) and to develop an approach to the integration of this material for the solution of problems of health and illness in infancy, childhood, and adolescence. This should be accomplished with continuing reference to the basic principles of pathophysiology encountered in the first year courses.

Those patients to whom the student is assigned provide the focus for case studies. In addition to the careful history and physical examination which must be recorded, the student is expected to organize an appropriate differential diagnosis and to seek and read pertinent reference material relevant to each patient. The student should learn to present each case verbally in an organized and succinct fashion, to follow the patient's progress, and to interpret all studies which are performed. The student is expected to learn from a number of sources: standard textbooks and journals, current publications and conferences, and also from people—house staff, faculty, nurses, parents, and all others with whom contact is made in the clinical setting.

Objectives should also include an understanding of the roles played in pediatrics by other members of the health care team, both in the ambulatory and hospital settings. Patient care may include nurse, social worker, recreation therapist, psychologist, physiotherapist, dietitian, and others. The eight weeks is divided to include time into several of the following settings: (a) Duke outpatient clinics and emergency room, (b) Duke inpatient, (c) Durham Regional Hospital, (d) Duke nursery, (e) Lincoln Community Health Center, and (f) community practices in and away from Durham. Weight: 8. Drucker

Electives

PED-210C. Advanced Pediatrics. This course permits the student to elect an in-depth experience within pediatrics. Each student has a specific faculty preceptor who develops and implements the curriculum tailored to the individual's needs. Listed below are the faculty representatives to contact. Arrangements for the special topic should be made with these individuals prior to enrolling in the course. The name of the preceptor with whom a student is working must be noted on the registration card submitted to the registrar's office. Weight: 1 to 8 Max: 1. *Drucker and departmental division chiefs*

Division	Faculty	Telephone
Allergy/Immunology	Rebecca H. Buckley, M.D.	684-2922
Cardiology	Stephen P. Sanders, M.D.	681-2916
Critical Care Medicine	Jon N. Meliones, M.D.	681-6403
Emergency Department	Karen Frush, M.D.*	684-5537
Endocrinology	Michael S. Freemark, M.D.	684-3772
Gastroenterology	William R. Treem, M.D.	681-4841
General Pediatrics	Dennis A. Clements, M.D., Ph.D.	477-4297
Hematology/Oncology	Philip Rosoff, M.D.	684-3401
Infectious Diseases	Ross McKinney, M.D.	684-6335
Medical Genetics	Y. T. Chen, M.D., Ph.D.	684-2036
Nephrology	John W. Foreman, M.D.	684-4246
Neurology	Darrell Lewis, M.D.	684-3219

* The student participates in the initial evaluation, stabilization and management of pediatric medical and surgical patients in the emergency department. Special emphasis is placed on the approach to the pediatric trauma victim. Weekly didactic lectures and case review conferences are offered. The student is expected to research a relevant topic of his/her interest and lead a brief discussion with faculty and housestaff during the elective. The student is evaluated by the ED attending staff and receives ongoing feedback throughout the rotation as well as a formal "exit interview."

Perinatal Medicine	David T. Tanaka, M.D.	681-6024
Pulmonary	Thomas M. Murphy, M.D.	684-3364
Rheumatology	Deborah Kredich, M.D.	684-6575
Rural Health Clinics	Joanne Barton, Dr.P.H.+	684-3172
Sports Medicine	Deborah Squire, M.D.	477-4297

PED-211C. Pediatric Infectious Diseases. This course provides experience in the clinical and laboratory diagnosis of infectious diseases and in their therapy. The student works closely with the infectious disease fellow and participates actively in evaluation of patients. Daily rounds in microbiology laboratory. Participation in student-faculty seminars is required. Weight: 4 or 8 Max: 2. *McKinney, Gutman, Katz, Drucker, Walter, Clements, and Alexander*

PED-215C. Endocrine Disorders in Children. Students attend in the Pediatric Endocrine, Diabetes, Neuroendocrine (Brain Tumor), and Bone and Mineral Clinics and assume active roles in the evaluation and management of inpatients admitted to the Endocrine Service. Emphasis is placed upon the evaluation of growth and sexual development as indices of endocrine status during childhood. Students also participate in a monthly endocrine journal club and in weekly intra- and interdepartmental endocrine clinical and research conferences. Prerequisite: contact instructors. Weight: 4 or 8 Max: 2. *Freemark*

PED-217C. Pediatric Hematology and Oncology. Includes all aspects of clinical and laboratory pediatric hematology as well as the diagnostic evaluation, care, and treatment of patients with malignant diseases. Emphasis is placed on fundamental concepts. There are daily ward rounds, five clinics weekly, conferences, and seminars as well as assigned reading. Students rotate through the outpatient clinics, inpatient hematology-oncology, and the bone marrow transplant unit. Prerequisites: contact instructor. Weight: 4 or 8 Max: 2. *Rosoff, Falletta, Kinney, Kurtzberg, Friedman, Bottom, Ashley, Longee, Ware, Adams, and Olson*

PED-221C. Poison Control. Primarily a seminar course with one, two-hour conference per week scheduled for student discussion on assigned topics. This is a student-oriented teaching program and individual projects on the subject may also be carried out. Students must register for this course at least four weeks prior to the first day of class. Further, students must talk with Dr. Osterhout about the course at least one week before this same date. The course is not taught May-August. If permitted by the instructor, this clinical science course can be audited. Weight: 2 Max: 4. *Osterhout*

PED-225C. Neonatology. Students have patient care responsibilities and experiences in the Duke North Intensive Care Nursery. The course involves direct participation in patient care under the supervision of the faculty and housestaff. Emphasis is placed on the initiation of parent-child relationships and a pathophysiologic approach to assessment and management of the critically ill neonate. This is a sole-enrollment course and, as such, cannot be taken in conjunction with any other course. Weight: 5 Max: 1. *Tanaka, Goldstein, Auten, Pane, and Goldberg*

+The Rural Health Clinics rotation provides a broad exposure to general pediatric problems in a medically indigent community. Four days a week (Monday through Thursday) the student travels with a senior pediatric resident to each of four rural county health departments to provide pediatric care in collaboration with public health nurses and child health clinicians. There is approximately two hours driving time each day, which allows for a one-on-one tutorial with the senior resident. The Special Topics course may vary from two to four weeks in length. Student may not drop within sixty days of the starting date without finding a replacement. Student must contact Dr. Barton three weeks before the course starting date.

PED-231C. Clinical Pediatric Cardiology. This course provides an intensive learning experience in the clinical diagnosis and management of childhood heart disease. Emphasis is placed upon the pre and postoperative management of children with operable heart disease as well as upon the management of children with nonoperable heart disease. The student also is exposed to pediatric acute care medicine and the modalities available to maintain cardiovascular function in the extremely ill child. Scope: history, physical examination, and special diagnostic techniques (echocardiography, electrocardiography, phonocardiography, cardiac catheterization, and cineangiography). Students participate on daily ward rounds, outpatient clinics four days per week, and all clinical and didactic teaching conferences of the division. Prerequisites: PED-205C. Weight: 4 (or 8 with special permission of the instructor) Max: 2. *Sanders, Talner, and Armstrong*

PED-233C. Allergy and Clinical Immunology. Clinical evaluation and practice in use of methods of diagnosis and treatment of allergic and immunologic disorders including the atopic diseases, immunologic deficiency states, and bone marrow transplantation. Scope: in-depth seminars, history, physical examination, skin testing, a variety of clinical immunologic tests, and Clinical Research Unit experience. Weight: 4 or 8 Max: 3. *Buckley, Markert, Williams, and Harville*

PED-234C. Clinical Genetics and Metabolism. The student becomes familiar with evaluation and management of various genetic disorders including malformation syndromes and biochemical disorders. History taking, pedigree construction and analysis, specialized aspects of the dysmorphological physical examination, diagnostic techniques, routine and specialized laboratory methods (cytogenetic, biochemical, molecular), and reference materials (texts and computer programs) are covered. Students participate in weekly teaching and clinical conferences and may take part in prenatal evaluations. May take with BCH-234B. Weight: 4 Max: 2. *Kahler*

PED-241C. Pediatric Nephrology. The course is designed to provide experience in diagnosis, interpretations of laboratory tests, natural history, and treatment of acute and chronic disorders of the kidney in children. The student is also exposed to the management of fluid and electrolyte disorders in infants and children. Prerequisites: PTH-362B suggested; prior approval of Dr. Wigfall. Weight: 4 Max: 1. *Foreman and Wigfall*

PED-243C. Adolescent Medicine. Students participate in a weekly seminar with emphasis on the behavioral and developmental aspects of adolescence, drug abuse, sports medicine, and the pregnant teenager. Patient interactions are arranged in the Youth Clinic at the Duke General Pediatric Clinic on Monday afternoon and/or the Sports Medicine Clinic on Thursday afternoon. Tutorial and supervisory time to discuss specific patients and pertinent literature are arranged. Weight: 2 Max: 2. *Yancy, Squire, Moses, Mahaffey, Oehler, and Wilczynski*

PED-250C. Advanced General Pediatrics, Pediatric Intensive Care Unit. This advanced course is designed to allow students a four week experience as a subintern in the Pediatric Intensive Care Unit. Under supervision of faculty attendings and resident housestaff, the senior student assumes primary responsibility for the care of critically ill children admitted to the Medicine and Surgery services in the Pediatric Intensive Care Unit. Emphasis is placed on the development of the pathophysiologic approach to the diagnosis and therapy of a broad spectrum of pediatric illnesses as they present in acute care settings. Advanced concepts in pediatric critical care are emphasized. Students rotate night call with resident pediatric housestaff. Prerequisite: PED-205C. Weight: 5 Min: 1 Max: 2. *Meliones, Kern, Schulman, and Grayck*

PED-260C. Advanced Clerkship in Pediatrics. This course is designed to provide the student with an intensive, in-depth exposure to the diagnosis and management of pediatric patients hospitalized at Duke. Students are responsible for admission histories, physical examinations, and management throughout the hospitalization. The student serves as a subintern throughout the rotation. Night call is expected every fourth night. This is a sole-enrollment course and cannot be taken in conjunction with any other course. Weight: 5 Max: 2. *Drucker, Kredich, and faculty*

PED-281C. Pediatric Neurology. Students examine both hospitalized and ambulatory patients with neurological disorders. Emphasis is placed on the neurological history, examination, investigation, and management techniques of nervous system disorders of infancy, childhood, and adolescence. Prerequisites: contact Dr. Lewis. Weight: 4 or 8 Max: 2. *Lewis*

Pharmacology

Professor Anthony R. Means, Ph.D. (Texas-Austin, 1966), *Chairman*.

Professors: Mohammed Abou-Donia, Ph.D. (California-Berkeley, 1966); Everett H. Ellinwood, M.D. (North Carolina, 1959); Cynthia M. Kuhn, Ph.D. (Duke, 1975); Elliott Mills, Ph.D. (Columbia, 1964); J. Victor Nadler, Ph.D. (Yale, 1972); Saul M. Schanberg, M.D. (Yale, 1964), Ph.D. (Yale, 1961); Theodore Slotkin, Ph.D. (Rochester, 1970); Harold C. Strauss, M.D., C.M. (McGill, 1964); Gary Stiles, M.D. (Vanderbilt, 1975); Pelham Wilder, Ph.D. (Harvard, 1950).

Associate Professors: Elwood A. Linney, Ph.D. (California-San Diego, 1973); Donald McDonnell, Ph.D. (Baylor, 1987); James O. McNamara, Sr., M.D. (Michigan, 1968); Keith L. Parker, M.D., Ph.D. (Washington Univ., 1981); Rochelle D. Schwartz, Ph.D. (Georgetown, 1983); Shirish Shenolikar, Ph.D. (Leeds, 1975); A. Richard Whorton, Ph.D. (Vanderbilt, 1975).

Assistant Professors: Sheila Collins, Ph.D. (Massachusetts Inst. Tech., 1985); Robert T. Fremeau, Jr., Ph.D. (George Washington, 1985); Samuel E. George, M.D. (Washington Univ. 1980); Joseph Heitman, M.D. (Cornell, 1992), Ph.D. (Rockefeller, 1989); Homme W. Hellinga, Ph.D. (Cambridge, 1986); Madan M. Kwatra, Ph.D. (Montreal, 1977); Edward D. Levin, Ph.D. (Wisconsin, 1984); Tobias Myer, Ph.D. (Basel, 1986); Ann Marie Pendergast, Ph.D. (California-Riverside, 1985); Kevin G. Peters, M.D. (Iowa, 1983); Debra A. Schwinn, M.D. (Stanford, 1983); Antonius Van Dongen, Ph.D. (Leiden, 1988); Xiao-Fan Wang, Ph.D. (California-Los Angeles, 1986); John D. York, Ph.D. (Washington Univ., 1993).

Research Professors: Gertrude Elion, D.Sc. (George Washington, 1969); Wilkie A. Wilson, Jr., Ph.D. (Duke, 1971).

Associate Research Professor: Jorge Bartolome, Ph.D. (Univ. of Chile, 1978).

Assistant Research Professors: Donald L. Campbell, Ph.D. (Texas-Galveston, 1986); Ram Gupta, Ph.D. (Delhi, 1982); Maxine Okazaki, Ph.D. (Toronto, 1984); Frederic J. Seidler, Ph.D. (Duke, 1986).

Adjunct Professors: Robert Ferris, Ph.D. (Nebraska, 1967); Humberto Viveros, M.D. (Univ. Chile, 1962); Joseph Yanai, Ph.D. (Colorado, 1971).

Adjunct Associate Professors: Richard J. Kavlock, Ph.D., (Miami, 1977).

Adjunct Assistant Professors: Rochelle Hanley, M.D. (Michigan, 1978); Christopher Lau, Ph.D. (Duke, 1982); David Martin, Ph.D. (London, 1987); Herman A. Navarro, Ph.D. (Kentucky, 1987).

Emeriti: Norman Kirshner, Ph.D.; Leon Lack, Ph.D.; Athos Ottolenghi, M.D.

Required Course

PHR-200B. Medical Pharmacology. This basic course in pharmacology for medical and graduate students describes the action of drugs in relation to biochemical and physiological processes and the rationale for their clinical use. Additional topics include pharmacokinetics, drugs of abuse, and commonly encountered toxins. Nine lectures and one small-group, case-based discussion per week for eight weeks, April-June. Weight: 4. *Nadler and staff*

Electives

PHR-233B. Essentials of Pharmacology and Toxicology. Drug absorption, distribution, excretion and metabolism; structure and activity relationships; drug and hormone receptors and target cell responses. C-L: Graduate School. Weight: 4 Min: 5 Max: 30. *Slotkin and staff*

PHR-234B. Interdisciplinary Approach to Pharmacology. Several model systems (cardiovascular, reproductive, neural, and cell cycle) are be used to explore the molecular, biochemical, and physiologic basis of drug action. CL: Graduate School. Weight: 3 Max: 20. *Shenolikar and staff*

PHR-255B. Pharmacotherapy of Common Problems in Internal Medicine. The purpose of this course is to integrate basic pharmacology with rigorous clinical science in order to understand how drugs should be used to treat common medical problems. Examples of topics to be covered are: heart failure, stroke, arthritis, hypertension, asthma, infectious disease, diabetes and cancer. Two lectures per week during the spring term. This course is offered to third year students for basic science credit. Fourth year students may take the course for clinical credit by registering for MED-255C. C-L. MED-255C. Weight: 2. *Nadler and Pritchett*

PHR-372B. Research in Pharmacology. Laboratory investigation in various areas of pharmacology. C-L: Graduate School. Credit to be arranged. Weight: 1-16. *Staff*

Psychiatry

Professor Allen Frances, M.D. (SUNY-Downstate, 1967), *Chairman*.

DIVISION OF BEHAVIORAL MEDICINE

Professor Redford B. Williams, Jr., M.D. (Yale, 1967), *Division Head*.

Professor: Roy J. Mathew, M.B. (Med. Coll. Trivandrum, India, 1970); Redford B. Williams, Jr., M.D. (Yale, 1967).

Associate Professor: Valerie F. Holmes, M.D. (Louisville, 1980).

Assistant Clinical Professors: Lakshmi Kamaraju, M.D. (Andhra, 1976); Indira M. Varia, M.D. (Shah Med. Coll., 1968); Michael R. Volow, M.D. (Seton Hall, 1964).

Clinical Associate: Katayoun Tabrizi, M.D. (Tehran, 1984).

Research Associates: John Feaganes, Ph.D., Michael J. Helms.

DIVISION OF BIOLOGICAL PSYCHIATRY

Professor K. Ranga Krishnan, M.D. (Madras Med. Coll., 1978), *Division Head*.

Professors: Everett H. Ellinwood, Jr., M.D. (North Carolina, 1959); C. William Erwin, M.D. (Texas, 1960); Saul M. Schanberg, M.D., Ph.D. (Yale, 1964); Theodore A. Slotkin, Ph.D. (Rochester, 1970).

Consulting Professor: Richard J. Wyatt, M.D. (Johns Hopkins, 1964).

Adjunct Professor: Jau-Shyon Hong, Ph.D. (Kansas, 1973).

Associate Professors: Edward D. Levin, Ph.D. (Wisconsin, 1984); Joseph P. McEvoy, M.D. (Vanderbilt, 1973); Bruno J. Urban, M.D. (Albertus-Magnus, Germany, 1960); Richard Weiner, M.D, Ph.D. (Duke, 1975).

Assistant Professors: P. Murali Doraiswamy, M.D. (Univ. Madras, 1987); Lawrence A. Dunn, M.D. (Michigan, 1984); Veeraindar Goli, M.D. (Osmania Med. Coll., 1978); Scott D. Moore, M.D. (Virginia, 1986); Rochelle Schwartz-Bloom, Ph.D. (Georgetown, 1983); David Steffens, M.D. (Texas, 1988).

Assistant Consulting Professors: Stephen L. Oxley, M.D. (Kentucky, 1973); Robert G. Ruegg, Jr., M.D. (Virginia, 1970).

Associate Research Professor: Jed E. Rose, Ph.D. (California-San Diego, 1978).

Assistant Medical Research Professors: Sheila Collins, Ph.D. (Massachusetts Inst. Tech., 1985); Tong H. Lee, M.D. (Stanford), Ph.D. (Duke, 1986); Syam Sundar, Ph.D. (India Inst. Med. Services, 1978).

Associate: Leann Nelson, M.D. (Texas, 1986).

Clinical Associates: Christopher Byrum, M.D. (Virginia, 1988); Marian Butterfield, M.D. (North Carolina-Greensboro, 1990); Frederick Cassidy, M.D. (Vanderbilt, 1988).

Consulting Associates: Joseph Balla, M.D. (Illinois, 1988); Byron Cole, M.D. (Cincinnati, 1960); Ugo Goetzl, M.D. (New York Med. Coll., 1968); Allen Hamrick, M.D. (North Carolina, 1987).

Adjunct Associate: Richard Weisler, M.D. (North Carolina, 1976).

Instructors: Ursula Goebels, M.A. (Illinois, 1983); R. Thomas Mathew, M.D. (Massachusetts, 1986).

Research Associates: Jeffrey Calton, Ph.D. (Missouri-Columbia, 1995); Jeffrey Cohn, Ph.D. (Tulane, 1988); Shiyang Wang, Ph.D. (North Carolina State, 1992); Jamie Yang, Ph.D. (Kentucky, 1992).

DIVISION OF CHILD AND ADOLESCENT PSYCHIATRY

Assistant Clinical Professor Allan Chrisman, M.D. (George Washington, 1971), *Division Head*.

Professor: John G. Looney, M.D. (Southwestern, 1969).

Visiting Research Professor: Robert Coles, M.D. (Columbia, 1954).
 Associate Professors: J. David Jones, M.D. (Duke, 1954); Charles R. Keith, M.D. (Harvard, 1961).
 Associate Clinical Professor: W. Samuel Yancy, M.D. (Duke, 1961).
 Assistant Professors: Lisa Amaya-Jackson, M.D. (North Carolina, 1986); Adrian C. Angold, B.Sc. (London Hosp. Med. Sch., 1976); John S. March, M.D. (California- Los Angeles, 1978).
 Assistant Clinical Professor: Karl Stevenson, M.D. (Bowman Gray, 1966).
 Assistant Research Professors: Alaattin Erkanli, Ph.D. (Carnegie Mellon, 1991).
 Assistant Consulting Professors: Cesar Guajardo, M.D. (Univ. Nuevo Leon, Mexico, 1961); James B. Payton, M.D. (Arkansas, 1971); Ingrid Pisetsky, M.D. (Albert Einstein, 1971).
 Clinical Associates: Lucy T. Davis, Ed.D. (Columbia, 1955); Ranota D.T. Hall, M.D. (East Tennessee State, 1987); Paul D. Nagy, M.S. (Florida State, 1984); Carol J. Vander-Zwaag, M.D. (Mount Sinai, 1986).
 Consulting Associates: Peter F. Adland, M.D. (Georgetown, 1975); Linwood R. Allsbrook, M.D. (Kentucky, 1981); Thomas C. Cornwall, M.D. (Northwestern, 1970); Peter T. Daniolos, M.D. (North Dakota, 1989); Bonny Gregory, M.D. (Med. Coll. Georgia, 1978); Bryon Herbel, M.D. (North Dakota, 1986); D. Randall Johnson, M.D. (South Carolina, 1983); Michael S. Lancaster, M.D. (Tulane, 1975); Nancy J. Livingston, M.D. (Duke, 1972); William Mackey, M.D. (Tennessee, 1969); Vladimir Maletic, M.D. (Belgrade, 1981); Jane L. Pope, M.D. (Louisville, 1972); Daphne Rosenblitt, M.D. (Duke, 1974); Donald L. Rosenblitt, M.D. (Duke, 1973); David A. Smith, M.D. (Alabama, 1980); Elizabeth S. Stanton, M.D. (Mississippi, 1982).
 Adjunct Associate: Jean G. Spaulding, M.D. (Duke, 1972).
 Instructors: Barbara J. Smith, M.Ed. (North Carolina Central, 1983).

DIVISION OF GENERAL PSYCHIATRY

Professor Jesse O. Cavenar, Jr., M.D. (Arkansas, 1963), *Division Head*.
 Clinical Professor: Steven Lipper, M.D. (Boston, 1972).
 Associate Professor: Jean Hamilton, M.D. (Texas, 1977).
 Associate Consulting Professor: Pedro J. Igaray, M.D. (Univ. Nacional Autonoma de Mexico, 1955).
 Assistant Professor: Elliott B. Hammett, M.D. (Duke, 1966).
 Assistant Clinical Professors: Conrad C. Fulkerson, M.D. (Missouri, 1969); Harold S. Kudler, M.D. (SUNY, 1979); Roy Stein, M.D. (Duke, 1980).
 Assistant Consulting Professors: Christine Machemer, M.D. (Freiburg, 1959); Ervin Thompson, M.D. (Vanderbilt, 1972).
 Associate: Rosa F. Merino, M.D. (Case Western Reserve, 1985).
 Clinical Associates: Elizabeth King, M.D. (Duke, 1958); Robert E. Winton, M.D. (Vanderbilt, 1972).
 Consulting Associates: Thomas W. Brown, M.D. (Case Western Reserve, 1978); Jeffrey R. Chambers, M.D. (Michigan, 1986); Philip Hillsman, M.D. (Tennessee-Memphis, 1987); Rose Shalom, M.D. (Harvard, 1978); Jonathan Weiner, M.D. (North Carolina, 1987).

DIVISION OF GERIATRIC PSYCHIATRY

Associate Professor John C.S. Breitner, M.D., M.P.H. (Pennsylvania, 1970), *Division Head*.
 Professors: J. P. Gibbons Professor Dan G. Blazer, M.D. (Tennessee, 1969), Ph.D. (North Carolina, 1980); Bernard J. Carroll, M.B., Ph.D. (Melbourne, 1964, 1971); Daniel T. Gianturco, M.D. (Buffalo, 1960).
 Associate Professors: Harold G. Koenig, M.D. (California-San Francisco, 1982); John C. S. Breitner, M.D., M.P.H. (Pennsylvania, 1970).
 Assistant Research Professor: Judith C. Hays, R.N., Ph.D. (Yale, 1991).
 Clinical Associates: Peter Barboriak, M.D., Ph.D. (Duke, 1989); Sharon M. Wallsten, B.S.N., M.P.H. (Michigan, 1965).
 Consulting Associates: Andree Allen, M.D. (Miami, 1982); Leslie Hocking, M.D. (Tufts, 1983).
 Research Associate: Bruce Burchett, Ph.D. (Carleton, 1983).
 Research Assistant: Nancy E. Fowler, M.Ed. (North Carolina, 1971).
 Instructor: Cornelia B. Service, M.P.H. (North Carolina, 1979).

DIVISION OF MEDICAL PSYCHOLOGY

Professor Robert J. Thompson, Ph.D. (North Dakota, 1971), *Division Head*.
 Professors: Irving Alexander, Ph.D. (Princeton, 1949); James A. Blumenthal, Ph.D. (Washington, 1975); Barbara J. Burns, Ph.D. (Boston, 1972); Robert Carson, Ph.D. (Northwestern, 1957); C. Keith Conners, Ph.D. (Harvard, 1960); Herbert Crovitz, Ph.D. (Duke, 1970); Francis J. Keefe, Ph.D. (Ohio, 1975); Martin Lakin, Ph.D. (Chicago, 1955); Susan Roth, Ph.D. (Northwestern, 1973); Susan Schiffman, Ph.D. (Duke, 1970); S. Richard Surwit, Ph.D. (McGill, 1972).
 Research Professors: David J. Madden, Ph.D. (California-Davis, 1977); Gerda Fillenbaum, Ph.D. (London, 1956).

Adjunct Professors: Florence Kaslow, Ph.D. (Bryn Mawr, 1969); Rune Simeonsson, Ph.D. (George Peabody, 1971).

Associate Professors: Norman B. Anderson, Ph.D. (North Carolina-Greensboro, 1983); Elizabeth J. Costello, Ph.D. (London, 1981); Elaine K. Crovitz, Ph.D. (Duke, 1964); John F. Curry, Ph.D. (Catholic Univ., 1978); Mark Feinglos, M.D. (McGill, 1973); John E. Lochman, Ph.D. (Connecticut, 1976); Patrick E. Logue, Ph.D. (North Dakota, 1965); Gail Marsh, Ph.D. (Iowa, 1968); Andrew Sherwood, Ph.D. (Univ. Hull, England); Robert Shipley, Ph.D. (Michigan State, 1972); W. Derek Shows, Ph.D. (Duke, 1967); Ilene C. Siegler, Ph.D. (Syracuse, 1973); Karen C. Wells, Ph.D. (Georgia, 1978); Kathleen A. Welsh-Bohmer, Ph.D. (Virginia, 1985).

Associate Clinical Professors: Jack D. Edinger, Ph.D. (Virginia Commonwealth, 1971); Rolffs S. Pinkerton, Ph.D. (Georgia, 1967); Clive J. Robins, Ph.D. (SUNY, 1982); Anna L. Stout, Ph.D. (South Carolina, 1980); Scott Swartzwelder, Ph.D. (American Univ., 1980); Joseph E. Talley, Ph.D. (Virginia, 1977).

Adjunct Associate Professor: Paul T. Costa, Jr., Ph.D. (Chicago, 1970); John A. Fairbank, Ph.D. (Auburn, 1980); William C. Wetsel, Ph.D. (Massachusetts Inst. Tech., 1983).

Associate Consulting Professors: Lenore Behar, Ph.D. (Duke, 1973); Paul Brinich, Ph.D. (Chicago, 1974).

Associate Research Professors: John C. Barefoot, Ph.D. (North Carolina, 1968); James Lane, Ph.D. (UCLA, 1979); William H. Wilson, Ph.D. (Vanderbilt, 1973).

Assistant Professor: Jean Beckham, Ph.D. (Florida State, 1988); Kathryn Gustafson, Ph.D. (Ohio, 1988); Richard S. E. Keefe, Ph.D. (New York, 1990); Barbara R. Keith, Ph.D. (Alabama, 1992); Karen O'Donnell, Ph.D. (North Carolina, 1983); Edward C. Suarez, Ph.D. (Miami, 1986).

Assistant Clinical Professors: John Babyak, Ph.D. (Kansas, 1995); John Barrow, Ph.D. (Houston, 1971); Randy Borum, Ph.D. (Florida-Melbourne, 1992); Tracey Potts Carson, Ph.D. (Georgia, 1982); Susan Head, Ph.D. (Louisiana State, 1991); Steve Herman, Ph.D. (Duke, 1977); Martin Ionescu-Pioggia, Ph.D. (North Carolina, 1985); Ronette L. Kolotkin, Ph.D. (Minnesota, 1978); Deborah C. Koltai, Ph.D. (California Sch. Prof. Psych., 1993); Albert D. Loro, Jr., Ph.D. (Washington, 1976); Jerri M. Oehler, Ph.D. (Duke, 1984); Oliver Oyama, Ph.D. (Indiana, 1985); Ann C. Schulte, Ph.D. (Texas, 1983); Gail A. Spiridigliozzi, Ph.D. (Kansas, 1988); Craig R. Stenberg, Ph.D. (Denver, 1982).

Assistant Research Professors: Emily Arcia, Ph.D. (North Carolina, 1988); George R. King, Ph.D. (SUNY-Stony Brook, 1989); Isaac M. Lipkus, Ph.D. (North Carolina); H. Ryan Wagner, Ph.D. (New Mexico, 1975).

Adjunct Assistant Professors: Ralph Cooper, Ph.D. (Rutgers, 1973); William E. Schlenger, Ph.D. (North Carolina State, 1974).

Adjunct Assistant Research Professor: Maya McNeilly, Ph.D. (Georgia, 1987).

Assistant Consulting Professors: William D. Barley, Ph.D. (Texas Tech., 1980); William V. Burlingame, Ph.D. (Washington, 1967); Roni Cohen, Ph.D. (Columbia, 1977); Brian Esterling, Ph.D. (Miami, 1991); Rodney Lowman, Ph.D. (Michigan State, 1979); Richard L. Munger, Ph.D. (Michigan, 1979).

Clinical Associates: Linda Barnett, Ph.D. (Kentucky, 1981); Melanie J. Bonner, Ph.D. (Virginia Polytechnic Inst., 1995); Loretta E. Braxton, Ph.D. (North Carolina, 1989); Robert Carels, Ph.D. (North Carolina, 1995); Barbara Eldredge, Ph.D. (Southern Illinois, 1996); Jeff Epstein, Ph.D. (South Carolina, 1994); David Fitzgerald, Ph.D. (Notre Dame, 1995); Rebecca F. Frank, Ph.D. (North Carolina, 1994); Jill L. Hazlett, Ph.D. (Indiana, 1990); Pamela S. Hazlett, Ph.D. (North Carolina, 1991); Judith Holder, Ph.D. (Illinois, 1995); Gordon J. Horn, Ph.D. (St. Louis, 1995); Marlene R. Jacobs, Ph.D. (Miami, 1995); Parinda Khatri, Ph.D. (North Carolina, 1996); Thomas R. Lynch, Ph.D. (Kent State, 1996); Robert Mankoff, Ph.D. (Georgia State, 1992); Jennifer Norton, Ph.D. (North Carolina, 1995); Paula K. Ogrocki, Ph.D. (Kent State, 1994); Ruth E. Quillian, Ph.D. (Miami, 1994); Lisa Reiter-Lavery, Ph.D. (Catholic Univ., 1996); Richard R. Rumer, Ph.D. (North Carolina, 1982); Rebecca Schein, Ph.D. (Fairleigh Dickinson, 1992); Larry A. Tupler, Ph.D. (Emory, 1989); Jay Weinstein, Ph.D. (Emory, 1996); Janet Whidby, Ph.D. (Duke, 1987); William K. Wohlgenuth, Ph.D. (Miami, 1995); Katherine Wright, Ph.D. (Georgia, 1996).

Adjunct Associates: Juesta M. Caddell, Ph.D. (Virginia Polytechnic Inst, 1991); Anita P. Holmes, M.P.H., J.D. (North Carolina, 1972); Mareah Steketee, Ph.D. (California Sch. Prof. Psych., 1992).

Consulting Associates: Steven J. Ashby, Ph.D. (Connecticut, 1976); Susanne E. Dunn, Ph.D. (Duke, 1989); Russell P. Hopfenberg, Ph.D. (Boston, 1992); Spencer Lyerly, Ph.D. (North Carolina State, 1987); Michael Murray, Ph.D. (South Florida, 1993).

Instructors: John T. Edwards, Ph.D. (Georgia, 1977); Susmita Kashikar-Zuck, Ph.D. (Wisconsin, 1995); Pamela Maxon, Ph.D. (Pennsylvania, 1994).

Research Associates: Lisa H. Brauer, Ph.D. (Chicago, 1994); John E. Bryant, Ph.D. (Howard, 1994); Barbara P. Bute, Ph.D. (Duke, 1988); Christine Crenshaw, Ph.D. (North Carolina, 1995); Thomas Haney, M.S.P.H. (North Carolina, 1978); Cecil McManus, Ph.D. (Howard, 1992) Kathleen Moore, Ph.D. (Kent State, 1995).

Associate in Research: Mary C. Murray, M.S. (North Carolina State, 1995).

DIVISION OF OUTPATIENT SERVICES

Professor Jonathan R.T. Davidson, M.D. (Univ. Coll., London, 1966), *Division Head*.

James B. Duke Professor: H. Keith H. Brodie, M.D. (Columbia, 1965).

Adjunct Professor: Harold A. Pincus, M.D. (Albert Einstein College, 1975).

Associate Consulting Professors: Joseph DeVeauh-Geiss, M.D. (SUNY-Upstate, 1972); David M. Hawkins, M.D. (Duke, 1966); Alan Metz, M.B.B.Ch. (Witwaterstand, 1978).

Assistant Professor: Stephen Ford, M.D. (East Tennessee State, 1980); Tana A. Grady, M.D. (Duke, 1986); Andrew Krystal, M.D. (Duke, 1987).

Assistant Clinical Professors: Kishore Gadde, M.D. (Guntur Med. Coll., 1978); David Naftolowitz, M.D. (SUNY-Albany, 1986); Patricia A. Ziel, M.D. (Michigan, 1968).

Assistant Consulting Professors: Jack W. Bonner III, M.D. (Southwestern, 1965); Stephen Buie, M.D. (North Carolina, 1981); Martin G. Groder, M.D. (Columbia, 1964); Linda H. Jackson, M.D. (North Carolina, 1965); Eric Peterson, M.D. (Duke, 1971); Robert D. Phillips, M.D. (Pennsylvania, 1952); Leo Potts, M.D. (Adelaide, 1954); Richard Selman, M.D. (Emory, 1972); Cynia B. Shimm, M.D. (Yale, 1950); Robert M. Wells, M.D. (Tulane, 1954).

Clinical Associates: Eileen P. Ahearn, M.D. (Duke, 1990); Carole Laskey, M.S.W. (Smith, 1983); Suzanne Sutherland, M.D. (Michigan State, 1988); Susan Wicke, M.D. (Ohio State, 1989).

Associates: Lou Ann Crume, M.D. (Kentucky, 1986); Caroline Haynes, M.D., Ph.D. (Duke, 1983); Theresa A. Yuschok, M.D. (Northwestern, 1986).

Consulting Associates: John A. Ascher, M.D. (North Carolina, 1980); Ernest R. Braasch, M.D. (SUNY, 1970); Lawrence Champion, M.D. (Wisconsin, 1973); John T. Clapacs, M.D. (Duke, 1992); Doris Iarovici, M.D. (Yale, 1992); Duncan McEwen, M.D. (Tulane, 1982); Rex Moody, M.D. (North Carolina, 1987); Mindy Oshrain, M.D. (Duke, 1983); Peter Z. Perault, M.D. (Vermont, 1977); Roger Perilstein, M.D. (Temple, 1982); William Price, M.D. (North Carolina, 1985); Ernest Raba, M.D. (Texas, 1972); Kathleen Seibel, M.D. (Minnesota, 1985); Philip M. Spiro, M.D. (Yale, 1983); Nathan R. Strahl, M.D. (North Carolina, 1983); David M. Susco, M.D. (Pennsylvania, 1983); Ronald L. Vereen, M.D. (Duke, 1981); Patricia Webster, M.S.N. (North Carolina, 1976); James R. Weiss, M.D. (Louisiana, 1973); James S. Wells, Jr., M.D. (North Carolina, 1977); Floyd C. Weisman, M.D. (Texas-Houston, 1982).

Instructors: Elizabeth Nicholes, PA-C. (Duke, 1979); Thomas Stephenson, M.D. (Michigan, 1972).

Research Associates: James R. Bachar, Ph.D. (Pittsburgh).

DIVISION OF PSYCHIATRIC SOCIAL WORK

Associate Muki Fairchild, M.S.W. (North Carolina, 1976), *Division Head*.

Clinical Assistant Professors: Lisa Gwyther, M.S.W. (Case Western Reserve, 1969); William S. Meyer, M.S.W. (Illinois, 1977).

Consulting Assistant Professor: William G. Saur, M.S.W., Ph.D. (Florida State, 1980).

Associates: Maxine R. Flowers, M.S.W. (Columbia, 1964); Edward Lueth, M.S.W. (North Carolina, 1982); Patricia Meadows, M.S.W. (Cincinnati, 1979); Diane E. Meglin, M.S.W. (Yeshiva, 1982).

Clinical Associates: Camille S. Arrington, M.S.W. (North Carolina, 1982); Edna M. Ballard, M.S.W. (North Carolina, 1980); Barbara A. Gau, M.S.W. (North Carolina, 1986); Gael McCarthy, M.S.W. (North Carolina, 1985); S. Kay Patterson, M.S.W. (Ohio State, 1967); Peter Perlman, M.S.W. (North Carolina, 1982); Andrew Silberman, M.S.W. (North Carolina, 1982); Libby E. Webb, M.S.W. (Indiana, 1980).

Consulting Associates: Bess Autry, M.S.W. (North Carolina, 1976); Mary Ann Black, M.S.W. (North Carolina, 1970); Natalie R. Boorman, M.S.W. (North Carolina, 1983); Mary Jane Burns, M.S.W. (North Carolina, 1974); Renate P. Guttman, M.S.W. (North Carolina, 1969); Stephen Hawthorne, M.S.W. (California, 1974); Debbie Hill, M.S.W. (North Carolina, 1987); Mary Gail Holton, M.S.W. (Richmond Prof. Inst., 1966); Cedar Koons, M.S.W. (North Carolina, 1993); Lois P. Minis, M.S.W. (North Carolina, 1981); Betty B. Parham, M.S.W. (Smith, 1971); Anne K. Parrish, M.S.W. (North Carolina, 1963); Joye Pursell, M.S.W. (North Carolina, 1978); Carolyn Thornton, M.S.W. (North Carolina, 1968); Timothy C. Wackerhagen, M.S.W. (South Carolina, 1986); Stella Waugh, M.S.W. (North Carolina, 1986); Elinor T. Williams, M.S.W. (North Carolina, 1977); Margaret Wilner, M.S.W. (Columbia, 1977).

Instructors: Christine Bell, M.S.W. (North Carolina, 1977); Nan T. Birchall, M.S.W. (Pennsylvania, 1979); Mary Sue Cherney, M.S.W. (North Carolina, 1983); Gary Cunha, M.S.W. (East Carolina, 1992); James Dolan, M.S.W. (Rutgers, 1981); Eugene B. Glenn, Jr., M.S.W. (North Carolina, 1981); Judith Herman, M.S.W. (North Carolina, 1983); M. Jane Howard, M.S.W. (Texas, 1979); Bohdan Hrynewych, M.S.W. (Catholic Univ., 1987); Meryl Kanfer, M.S.W. (Pennsylvania, 1994); Karl K. Kanoy, M.S.W. (Atlanta Sch. Social Work, 1979); Robert Laws, M.S.W. (North Carolina, 1978); John McLain, M.S.W. (North Carolina); Ylana N. Miller, Ph.D. (California-Berkeley, 1975); Patrick J. Murphy, M.S.W. (Our Lady of the Lake, 1974); Maureen Murray, M.S.W. (Smith, 1986); Twyla J. Peterson, M.S.W. (North Carolina, 1985); Marilyn D. Reedy, M.S.W. (Tulane, 1964); Susan Sweney, M.S.W. (North Carolina, 1986); Mickey Tullar, M.S.W. (North Carolina, 1982); Bobby Williamson, M.S.W. (Michigan State, 1979); Ann S. Willoughby, M.S.W. (North Carolina, 1988); Nancy B. Winer, M.S.W. (North Carolina, 1990); Mary Ann Zabrycki, M.S.W. (Illinois, 1980).

DIVISION OF SOCIAL AND COMMUNITY PSYCHIATRY

Associate Professor Marvin S. Swartz, M.D. (Tufts, 1980), *Division Head*.

Professors: Kurt Back, Ph.D. (Massachusetts Inst. Tech., 1949); James H. Carter, M.D. (Howard, 1966); Linda K. George, Ph.D. (Duke, 1975).

Adjunct Professor: David B. Larson, M.D. (Temple, 1973).

Associate Professors: Deborah T. Gold, Ph.D. (Northwestern, 1986); Jacquelyne J. Jackson, Ph.D. (Ohio State, 1960); Marvin S. Swartz, M.D. (Tufts, 1980).

Associate Clinical Professor: Keith G. Meador, M.D. (Louisville, 1982).

Associate Consulting Professor: Nicholas Stratas, M.D. (Toronto, 1957).

Assistant Professors: Jeffrey W. Swanson, Ph.D. (Yale, 1985); Dan L. Tweed, Ph.D. (Iowa State, 1975).

Adjunct Associate Professor: B. Kathleen Jordan, Ph.D. (Duke, 1986).

Assistant Consulting Professors: W. Eugene Broadhead, M.D. (Duke, 1981); Sally Johnson, M.D. (Jefferson, 1976); Kathryn Magruder-Habib, M.P.H., Ph.D. (North Carolina, 1978); John G. Wagnitz, M.D. (Ohio State, 1967).

Assistant Research Professors: Elizabeth M. Z. Farmer, Ph.D. (Duke, 1991); L. Richard Landerman, Ph.D. (Duke, 1978).

Clinical Associates: Lucile D. Clotfelter, M.D. (North Carolina, 1986); James N. Finch, M.D. (South Florida, 1981); Holly B. Rogers, M.D. (Texas, 1990); Carol Saur, M.S.N. (Amer. Sch. Nursing, 1965); Susan A. Van Meter, M.D. (Oklahoma, 1991).

Consulting Associates: B. Steven Bentsen, M.D. (Cincinnati, 1983); Bruce A. Berger, M.D. (Minnesota, 1977); Jeffrey Brantley, M.D. (North Carolina, 1977); Eugene A. Douglas, M.D. (North Carolina, 1959); Amilda Horne, M.D. (Texas, 1979); Barbara Johnson, M.D. (Minnesota, 1991); Gordon Lavin, M.D. (Case Western Reserve, 1978); Robert A. Millet, M.D. (Louisiana State, 1991); Elizabeth Murry, M.D. (Arkansas, 1992); Thomas D. Owens, M.D. (Louisiana, 1985); Mark S. Reynolds, M.D. (Tulane, 1983); James A. Smith III, M.D. (Howard, 1976); Lindsey Tweed, M.D. (Duke, 1987).

Adjunct Associate: Mary Lou Melville, M.D. (Texas, 1971).

Associate in Research: Sandra C. Leak, M.A. (Duke, 1979).

Lecturers: Robert Rollins, M.D. (Duke, 1956); N.P. Zarzar, M.D. (Amer. Univ., Beirut, 1956).

Required Courses

PSC-205C. Psychiatry. This course is a required six-week clerkship in clinical psychiatry for second year medical students. Students assume limited responsibility with supervision for the diagnosis and treatment of patients with common and severe psychiatric illnesses. Educational settings include inpatient psychiatry services at four different hospitals, psychiatry outpatient clinics, and the psychiatry emergency rooms of two hospitals. Students participate in a series of core didactic lectures and didactic modules which expose them to basic psychopathologic entities, differential diagnosis of psychiatric symptoms, practical application of treatment modalities, and issues of cost effectiveness in diagnosis and treatment. Students also participate in lectures, rounds, and clinical case conferences particular to their rotation site. Students are encouraged to observe psychotherapy and to participate in supervised psychological treatments wherever appropriate opportunities can be provided. Weight: 6. *C. Haynes*

Basic Science Electives

PSC-213B. Human Development: Birth-Adolescence. This course is a survey of the psychological development of the child from birth through adolescence. The first segment of the course is designed to provide the student with an awareness of some of the major theoretical orientations to child development including the psychoanalytic, Piagetian, and social learning positions. This is followed by a systematic study of the normal sequence of child development, focusing in particular on some of the major events in the cognitive, social, and emotional life of the child. The course is run in seminar fashion utilizing numerous theoretical and research papers as well as observation of children in naturalistic settings to facilitate class discussion. Students also are required to familiarize themselves with research in child development by doing a review of the literature in a defined area. Weight: 2 Min: 1. *Curry*

PSC-223B. Neurobiological Basis of Behavior. The course surveys neuroanatomical, neurophysiological, neurochemical and neuropharmacological evidence of central

nervous system function as it relates to normal and abnormal behavior. Clinical description, measurements of function and laboratory models of function as well as the biological substrates of affective disorders and psychoses are emphasized. Scientific bases of current therapeutic procedures, especially psychopharmacological, are examined. Course format consists of assigned readings, study questions, and lectures by faculty and other active researchers. Mid-term and final examinations are given. Each student is expected to critique a circumscribed area of research literature focusing on the appropriateness of conceptualizations and experimental methods. Additionally, students have an opportunity to become acquainted with, and to participate in, ongoing research. Weight: 4 Min: 1. *Staff*

PSC-297B. Ethnic and Minority Health Patterns and Problems. Descriptive and analytical focus on the literature about ethnic and minority health patterns in the United States, the issues inherent therein, and the implications thereof for the delivery of medical services. Weight: 4 Min: 1. *Carter*

PSC-299B. Preceptorship in Behavioral Neurosciences. This course provides an opportunity for the student to work closely with a member of the faculty in an area of mutual interest with emphasis upon research (see the booklet, *Basic Science Elective Program for Students in the Third Year*, Behavioral Neurosciences Study Program section, for partial list of interest areas; more complete descriptions available). Weight: 1-16. *Staff*

Clinical Science Electives

General questions regarding any of the clinical rotations should be referred to Caroline Haynes, M.D., Ph.D., director of medical student education (684-6406).

PSC-227C. Behavioral Aspects of Pediatrics. This course offers medical students the opportunity to study, as a part of an interdisciplinary team, the diagnosis and treatment of children and adolescents (ages two to twenty-one) with a variety of psychiatric problems. This may include anorexia nervosa, bulimia, enuresis, encopresis, school phobia, psychosomatic disorders, Tourette syndrome, suicidal and acting-out adolescents, chronically or terminally ill children, and child abuse and neglect cases. Students will study principles of psychological development, psychoanalytic, and family systems theory. The student participates in child, parent, and family interviews as an integral part of the treatment team. There is opportunity to be involved in the inpatient and outpatient treatment process on pediatric and adolescent psychiatric wards. C-L: PED-227C. Weight: 2-6. *J. D. Jones*

PSC-240C. Subinternship in Psychiatry. This course is an intensive clinical experience in the diagnosis and treatment of severe and incapacitating psychiatric disorders. The student is given more clinical responsibility than the comparable second year inpatient rotation. Patient care responsibilities include management of ward milieu. Treatment approaches emphasizing psychotropic medication and individual, family, and group psychotherapy are part of the clinical experience. Participation at selected patient care conferences and didactic lectures is expected. The rotation is available at Duke with specialty program experience that can be structured to include a survey of the variety of residential treatments available in this area. If desired, a student can arrange for a special reading tutorial in related topics (e.g., schizophrenia). Weight: 4 or 8 Max: 1. *VanMeter*

PSC-245C. Consultation - Liaison Psychiatry. The consultation-liaison services at both Duke Medical Center and VA Hospital offer clinical clerkships in the management of psychological problems of medical patients and somatic symptoms in psychiatric patients. The student does psychiatric consultations in various specialized medical and surgical services under supervision of residents and senior staff. Emphasis is placed on training the student in advanced interviewing techniques and in assessment and intervention for psychological reactions or depression due to medical illness. The site

selected and the specific specialty area chosen depends on the availability and location of psychiatric consultants with those interests. The rotation is flexible. We try to match student interests with the interests of available consultants. Students need to check with Dr. Volow (VA) or Dr. Varia (Duke) four weeks in advance on the current availability on this rotation. Weight: 4 or 8 Max: 1. *Varia*

PSC-251C. Community Psychiatry. The student develops a course based on selections from a variety of community and special population settings. These include the Durham Mental Health Center and its component units (children's services, alcohol and drug abuse and dependency treatment programs, programs for the care and training of the mentally retarded, and adult psychiatry services), the Federal Corrections Center at Butner, and the psychiatric service at the Lincoln Community Health Center. Students interested in this elective must contact Dr. Caroline Haynes at least eight weeks prior to the term selected for this course in order to develop a program tailored to the student's interests. Weight: 4 or 8 Max: 2. *Staff*

PSC-260C. Neuropsychiatry. Neuropsychiatry is the study of how alterations in brain structure and function produce disturbances in human behavior. In this course, the student becomes familiar with the major neuropsychiatric syndromes: dementia, delirium, and selective organic mental syndromes such as organic personality syndrome (e.g., frontal lobe syndrome) and organic affective syndrome (e.g., post-stroke depression). The student develops an understanding of diagnosis and treatment based upon a multidisciplinary clinical approach including specialized clinical neuropsychiatric exams. The patient population is drawn from the Duke Medical Center and Durham VA Hospital psychiatry, neurology, and neurosurgery services. Depending on the site, the student may also have an opportunity to become familiar with specialized neuropsychiatric approaches including psychometric testing and neural imaging techniques such as EEG and computerized EEG, CT scan, MRI, cerebral blood flow, and PET scan. The student must contact Dr. Volow four weeks prior to the term selected to confirm availability. Weight: 2-4 Max: 1. *Volow*

PSC-280C. Modern Psychotherapy I: Intensive Clinical Introduction. In this full-time (or near full-time) introduction, the student participates actively in assessment of outpatients for psychotherapy, short-term psychotherapy of inpatients, ongoing psychotherapy groups, and family therapy sessions. In addition he/she attends seminars on the various psychotherapeutic approaches: psychoanalytically oriented, cognitive, behavioral, interpersonal, systemic, etc. Readings are assigned and discussed. The student may pursue an area of special interest in greater depth with a selected preceptor. Permission of instructor is required to elect the course at any time other than section 41 of the fall term. Weight: 4 Min: 1. *H. Kudler*

PSC-343C. Clinical Aspects of Alcohol and Drug Abuse. This course offers a part-time or full-time experience at the Duke Alcoholism and Addiction Program or the VA Hospital in the diagnosis and treatment for patients who abuse alcohol and/or drugs. The interrelations of substance abuse with personality disorder and major psychiatric disorder is emphasized. Students may also choose to rotate on an inpatient/outpatient substance abuse program at the Duke Alcoholism and Addictions Program, the VA Hospital, or the Alcohol and Drug Addictions Treatment Center at John Umstead Hospital. Students must contact Dr. Stein or Dr. Mathew four weeks in advance to confirm availability. Weight: 4-8 Min: 1 Max: 2. *Mathew and Stein*

PSC-353C. Correctional/Forensic Psychiatry-Adult and Adolescent. Part-time or full-time experience in a correctional setting is offered. Diagnosis and treatment of adult and adolescent offenders with a variety of medical illnesses and behavioral disturbances are recognized. Elements of forensic psychiatry are stressed where appropriate. Supervision is provided by Duke faculty and the Central Prison hospital and mental health

staff. Opportunities for participation in a wide range of original and continuing research are available. Weight: 2-9 Max: 3. *Carter*

Radiation Oncology

Professor: Edward C. Halperin, M.D (Yale, 1969), *Chairman*.

Professors: Mark W. Dewhirst, D.V.M., Ph.D. (Colorado, 1975, 1979); Randy Jirtle, Ph.D. (Wisconsin, 1975); Leonard Prosnitz, M.D. (SUNY, 1961).

Associate Professors: Mitchell S. Anscher, M.D. (Virginia, 1981); David Brizel, M.D. (Northwestern, 1983); Lawrence B. Marks, M.D. (Rochester, 1985); Thaddeus V. Samulski, Ph.D. (SUNY-Buffalo, 1975).

Assistant Professors: John Anderson, M.D. (Arizona, 1991), Ph.D. (Virginia, 1988); Scott Clegg, Ph.D. (Arizona, 1988); Shiva K. Das, Ph.D. (Duke, 1990); Patricia Hardenbergh, M.D. (Brown, 1991); Michael T. Munley, Ph.D. (Duke, 1993); Deborah McLeod Prescott, D.V.M. (Georgia, 1982), Ph.D. (North Carolina State, 1989); Kenneth B. Weeks, Ph.D. (Texas-Austin, 1978); Su-Min Zhou, Ph.D. (Chicago, 1992).

Associates: Gunilla C. Bentel (Orebro Lans Sjukskoterskeskola, 1961); Kellie S. Condra, M.D. (Tennessee, 1992); Carol A. Hahn, M.D. (Georgetown, 1990); Sally S. Ingram, M.D. (North Carolina, 1988); Catherine G. Lee, M.D. (South Florida, 1988); Gregory Sibley, M.D. (Michigan, 1990); Curtis S. Whiddon, Ph.D. (Indiana, 1993).

Basic Science Electives

RON-227B. General Radiobiology. This course provides a comprehensive overview of radiation's interactions with cells and/or tissues and is oriented toward gaining an understanding of such interactions as they relate to the therapeutic use of radiation alone or in combination with chemotherapeutic drugs. Topics that are covered include carcinogenesis; radiation protection mutagenesis; DNA damage and repair; oncogene, suppressor gene and growth factor expression; methods for quantitating radiation damage *in vitro* and *in vivo*; tumor and normal tissue models for radiation studies; solid tumor metabolism, microenvironment, and physiology; radiation sensitizers and protectors; effects at the tissue and whole organ and whole organism level; time, dose, and fractionation; low dose rate radiotherapy, including use of radio labelled monoclonal antibodies; hyperthermia; radiation/drug and heat/drug interactions. Weight: 2 Max: 10. *Dewhirst*

RON-228B. The Basic Science of Oncology. In this course we discuss the molecular and cellular biology of cancer including oncogenes, tumor suppressor genes, growth factors, chromosomal abnormalities, cellular invasion and metastases, and the control of cell cycling. Tumor biology is considered including concepts of tumor doubling time, cell loss, tumor hypoxia, and fiber and foreign body, viral, and tobacco induced carcinogenesis/mutagenesis. The course concludes with a consideration of the basic science underlying cancer prevention, diagnosis, and therapy including the pharmacology of cancer chemotherapy, biologic and immunotherapy principles, radiobiology and hyperthermic oncology, and the scientific basis of surgical oncology practice. Weight: 3 Min: 3 Max: 25. *Halperin and guest lecturers*

RON-230B. Selected Topics in the Basic Science of Oncology. During the spring semester of the third year, students in the Cancer Biology Study Program are required to enroll in this seminar format course. Each week, students read a group of selected papers pertinent to the class. Then, at the ensuing class sessions, one of the researchers of the Cancer Center discusses the readings with the students and explores their application in his/her own laboratory. At the end of the semester, students are asked to review their own research in a format similar to a graduate seminar. Course grading is based on class participation and on a research paper which reviews the literature pertinent to the student's selected research topic. Weight: 1. *Halperin and staff*

Clinical Science Elective

RON-215C. Clinical Radiation Oncology. Radiation oncology plays a crucial role in the management of patients with cancer. The student begins this course with lectures,

individual tutorials, and audio-visual education programs to review the crucial elements of radiation biology, medical radiation physics, and dosimetry. This is followed by clinical instruction based in the ambulatory clinics of the Radiation Oncology Department as well as participation in brachytherapy procedures, care of inpatients, and new patient consultations. This course provides an introduction to the role of radiation therapy in the treatment of malignant disease. Weight: 4 or 8 Max: 2. *Halperin and staff*

Radiology

Professor: Carl E. Ravin, M.D. (Cornell, 1968), *Chairman*.

Professors: George S. Bisset III, M.D. (South Florida, 1975); James D. Bowie, M.D. (Oklahoma, 1967); Barbara Carroll, M.D. (Stanford, 1972); James T. T. Chen, M.D. (Natl. Defense Med. Ctr., Taiwan, 1950); R. Edward Coleman, M.D. (Washington Univ., 1968); Philip C. Goodman, M.D. (California-Los Angeles, 1970); Herman Grossman, M.D. (Columbia, 1953); E. Ralph Heinz, M.D. (Pennsylvania, 1955); Clyde A. Helms, M.D. (Texas-San Antonio, 1972); Ronald Jaszczak, Ph.D. (Florida, 1968); G. Allan Johnson, Ph.D. (Duke, 1974); Salutario Martinez, M.D. (Havana Univ., 1961); Rendon C. Nelson, M.D. (Loma Linda, 1980); James B. Duke Professor Charles E. Putman, M.D. (Texas-Galveston, 1967); Tony P. Smith, M.D. (East Carolina, 1981); Leonard D. Spicer, Ph.D. (Yale, 1968); Michael R. Zalutsky, Ph.D. (Washington Univ., 1974).

Research Professor: Carey Floyd, Jr., Ph.D. (Duke, 1981).

Associate Professors: William H. Briner, B.S. (Temple, 1954); D. Lawrence Burk, Jr., M.D. (Pittsburgh, 1981); Hal Cecil Charles, Ph.D. (New Orleans, 1981); William Currie, Ph.D. (North Carolina, 1964); James Dobbins III, Ph.D. (Wisconsin, 1985); William Foster, Jr., M.D. (Duke, 1973); Barbara Hertzberg, M.D. (Duke, 1980); Phyllis J. Kormuth, M.D., Ph.D. (Boston, 1976); Richard A. Leder, M.D. (Boston, 1984); Linda Gray Leithe, M.D. (Ohio State, 1982); James R. MacFall, Ph.D. (Maryland, 1976); Glenn E. Newman, M.D. (Duke, 1973); Edward F. Patz, Jr., M.D. (Maryland, 1985); Erik K. Paulson, M.D. (Duke, 1985); Charles Spritzer, M.D. (Pittsburgh, 1981); Robert H. Wilkinson, Jr., M.D. (Washington Univ. 1958).

Associate Clinical Professor: Robert Vandemark, M.D. (SUNY-Upstate, 1980).

Associate Research Professors: Laurence Hedlund, Ph.D. (Pittsburgh, 1968); Bruce Wieland, Ph.D. (Ohio State, 1973).

Assistant Professors: Salvador Borges-Neto, M.D. (Federal Fluminense Univ., 1981); Andrew J. Collins, M.D. (New Jersey, 1983); David Enterline, M.D. (North Carolina, 1982); M. Gena Frederick, M.D. (Louisville, 1989); Donald P. Frush, M.D. (Duke, 1985); Katrina Glazebrook, M.B., Ch.B. (Auckland, 1985); Michael W. Hanson, M.D. (West Virginia, 1974); David M. Hough, M.B., Ch.B. (Christchurch, 1984); Mary T. Keogan, M.D. (Trinity Coll., 1985); Mark A. Kliewer, M.D. (Duke, 1985); Vincent Low, M.B.B.S. (Western Australia, 1983); H. Page McAdams, M.D. (Duke, 1986); Vincent McDermott, M.B., B.Ch., B.A.O. (Univ. Coll.-Galway, 1982); Cindy R. Miller, M.D. (George Washington, 1985); Sara M. O'Hara, M.D. (Georgetown, 1988); Cynthia Payne, M.D. (Med. Coll. Ohio, 1980); James M. Provenza, M.D. (Albany, 1983); Mary Scott Soo, M.D. (Bowman Gray, 1987); Paul Suhocki, M.D. (Georgetown, 1985).

Assistant Clinical Professors: David Curtis, M.D. (Colorado, 1971); Donald Wenzel, M.D. (Georgetown, 1968); Margaret Eileen Williford, M.D. (Duke, 1976).

Assistant Research Professors: James Bowsher, Ph.D. (North Carolina, 1989); Timothy DeGrado, Ph.D. (Wisconsin-Madison, 1988); David Gilland, Ph.D. (North Carolina, 1989); Joseph Lo, Ph.D. (Duke, 1993); Bradley Smith, Ph.D. (Duke, 1988); Timothy Turkington, Ph.D. (Duke, 1989); Ganesan Vaidyanathan, Ph.D. (Kentucky, 1987).

Associates: Sheri Albers, D.O. (North Texas State, 1986); Joseph B. Cornett, M.D. (Virginia, 1988); Neil Davey, M.B., Ch.B. (Capetown, 1985); Jeremy Erasmus, M.B., Ch.B. (Witwatersrand, 1982); Kelly Freed, M.D. (Jefferson, 1991); Ruth Walsh, M.D. (Oklahoma, 1987).

Clinical Associates: David Beirne, M.D. (South Carolina, 1992); Mark Berger, M.D. (Minnesota, 1988); Scott Campbell, M.D. (North Carolina, 1987); Andrew Cooperman, M.D. (SUNY-Syracuse, 1992); Donna Culhane, M.D. (Nebraska, 1991); Ian Davey, M.B., Ch.B. (Cape Town, 1984); Wayne Eberenz, M.D. (Pennsylvania, 1990); Andrew Fisher, M.D. (Duke, 1992); Anthony Foti, M.D. (Michigan, 1992); Daniel Harris, M.D. (Wayne State, 1991); Christine Keesling, M.D. (Kansas, 1992); Nancy Major, M.D. (Tufts, 1988); Douglas Sheafor, M.D. (Washington Univ., 1992).

Electives

RAD-210C. Pediatric Radiology. A specialized program of instruction and participation in the wide variety of radiographic examinations in the pediatric age group. Special correlation of these examinations to the problems of specific diagnosis and patient care is made. Prerequisite: must contact Dr. Miller prior to registration. Weight: 4 or 8 Max: 2. *Miller and staff*

RAD-211C. Clerkship in Neuroradiology. A specialized program of detailed instruction in neuroradiology. The program includes participation in many interdepartmental conferences and the performance and interpretation of a variety of examinations including cerebral angiography, computerized axial tomography, magnetic resonance images, and myelography. Prerequisites: must contact Dr. Provenziale prior to registration. Weight: 4 or 8 Max: 2. *Provenziale and staff*

RAD-229C. Basic Radiology Clerkship. This course is designed to provide an overview of the various imaging modalities of diagnostic radiology and their clinical utility. The elective consists of: (a) lectures and film interpretation sessions supplemented by student presentations; (b) assignment to a variety of diagnostic radiology services during which students observe the performance of diagnostic and interventional studies; and (c) use of a teaching file of radiographs and diagnostic images. One week is spent on the thoracic radiology service. Additional rotations may include the musculoskeletal, neuroradiology, mammography, vascular/interventional, pediatric, CT/abdominal imaging, ultrasound, nuclear medicine, gastrointestinal, and VA Hospital services. Weight: 4 Min: 4 Max: 9. *Collins and staff*

RAD-250B. Research in Radiology. An individually arranged experience in which the student identifies with and participates in an established research program of a faculty member. Program should be arranged with DPA and proposed faculty member well in advance of starting date. Weight: 1-16 Max: 10. *G.A. Johnson*

Surgery

Professor Robert W. Anderson, M.D. (Northwestern, 1964), *Chairman*.

DIVISION OF GENERAL SURGERY

Professor Ralph R. Bollinger, M.D. (Tulane, 1970), Ph.D. (Duke, 1977), *Chief*.

Professors: Onyekwere Akwari, M.D. (Southern California, 1970); William G. Anlyan, M.D. (Yale, 1949); James B. Duke Professor Dani P. Bolognesi, Ph.D. (Duke, 1964), Experimental Surgery; J. W. and D. W. Beard Professor Eli Gilboa, Ph.D. (Weizmann Inst. Sci., 1977), Experimental Surgery; John P. Grant, M.D. (Chicago, 1969); Karen S. Guice, M.D. (New Mexico, 1977); J. Dirk Iglehart, M.D. (Harvard, 1975); George S. Leight, Jr., M.D. (Duke, 1972); Richard L. McCann, M.D. (Cornell, 1974); Keith T. Oldham, M.D. (Med. Coll. Virginia, 1976); Theodore N. Pappas, M.D. (Ohio State, 1981); J. W. and D. W. Beard Professor Jeffrey L. Platt, M.D. (California-Los Angeles, 1977), Experimental Surgery; Hilliard F. Seigler, M.D. (North Carolina, 1960); Delford L. Stickel, M.D. (Duke, 1953); David S. Warner, M.D. (Wisconsin, 1980); John L. Weinerth, M.D. (Harvard, 1967).

Research Professors: Per-Otto F. Hagen, F.H.W.C. (Watt Univ., Edinburgh, 1961), Experimental Surgery; Alphonse J. Langlois, Ph.D. (Duke, 1966), Experimental Surgery.

Clinical Professor: Hartwiz Bunzendahl, M.D. (Heidelberg, 1974).

Associate Professors: Darell D. Bigner, M.D., Ph.D. (Duke, 1965, 1971), Experimental Surgery; Pierre A. Clavien, M.D. (Geneva, 1985) Ph.D. (Toronto, 1992); Gregory S. Georgiade, M.D. (Duke, 1973); H. Kim Lysterly, M.D. (California-Los Angeles, 1983); Thomas J. Matthews, Ph.D. (Missouri, 1971), Experimental Surgery; Emil R. Petrusa, Jr., Ph.D. (Utah, 1979); R. Lawrence Reed II, M.D. (Virginia, 1976); Debra A. Schwinn, M.D. (Stanford, 1983); Robert N. Sladen, M.B., Ch.B. (Cape Town, 1970); Kent J. Weinhold, Ph.D. (Pennsylvania, 1979), Experimental Surgery.

Associate Research Professors: Jeffrey R. Marks, Ph.D. (California, 1985), Experimental Surgery; David C. Montefiori, Ph.D. (Clemson, 1982).

Associate Clinical Professors: Norbertus P. DeBruijn, M.D., M.Sc. (Gronigen, 1976); Brian J. McGrath, M.D. (Albany, 1982).

Adjunct Associate Professor: Jeffrey J. Collins, Ph.D. (Harvard, 1972), Experimental Surgery.

Assistant Professors: David B. Baldwin, Jr., M.D. (East Carolina, 1987), Emergency Medicine; Steven J. Bredhoeft, M.D. (Kansas, 1974); Kathleen A. Devine, M.D. (Maryland, 1987), Emergency Medicine; W. Steve Eubanks, Jr., M.D. (Alabama, 1987); Robert C. Harland, M.D. (Duke, 1983); Samuel M. Mahaffey, M.D. (West Virginia, 1979); Barbara A. Murphy, M.D. (Med. Coll. Pennsylvania, 1975), Emergency Medicine; Glenn E. Newman, M.D. (Duke, 1973); Mark W. Sebastian, M.D. (Rush, 1987); Bruce A. Sullenger, B.S. (Indiana), Experimental Surgery; Douglas S. Tyler, M.D. (Dartmouth, 1985); Steven N. Vaslef, M.D. (Virginia, 1984); Frances E. Ward, Ph.D. (Brown, 1965), Experimental Surgery; David K. Wellman, M.D. (Duke, 1971), Emergency Medicine; John L. Gray, M.D. (Duke, 1985).

Assistant Research Professors: Zeinab A. Abdel-Wahab, Ph.D. (Eastern Virginia, 1985), Experimental Surgery; Timothy L. Darrow, Ph.D. (SUNY, 1980); Michael L. Greenberg, Ph.D. (SUNY, 1984), Experimental Surgery; Emmanuel C. Opara, Ph.D. (London, 1984); William R. Parker, Ph.D. (Nebraska, 1992); Soheyla S. Saadi, Ph.D. (New York Univ., 1985).

Assistant Clinical Professors: David N. DuBois, M.D. (Georgetown, 1983); Paul C. Hendrix, B.S. (Coll. Charleston, 1970), B.H.S. (Duke, 1975); C. Michael Schuch, B.A. (North Carolina, 1977).

Assistant Consulting Professors: Toney W. Baskin, M.D. (Louisiana State, 1968); George M. Bilbrey, Jr., M.D. (Alabama, 1962); Albert H. Bridgman, M.D. (Louisiana, 1956); Rollins S. Burhans, Jr., M.D. (Louisville, 1963); William H. H. Chapman III, M.D. (Dartmouth, 1987); Eduardo Cuison, M.D. (Coll. Med. Surg., Santo Tomas, 1967); John T. Daniel, M.D. (Howard, 1964); William E. Eggebroten, M.D. (Jefferson, 1977); Peter A. Gentling, M.D. (Northwestern, 1964); Norman A. Hetzler, Jr., M.D. (Hahnemann, 1982); John D. Holcomb, M.D. (Arkansas, 1985); Charles A. Keller, Jr., M.D. (Louisiana State, 1959); Robert W. Kieffer, M.D. (Johns Hopkins, 1978); Julie E. Little, M.D. (Harvard, 1987); Walter J. Loefer, M.D. (Cornell, 1963); Kim R. Marley, M.D. (Wayne State, 1983); Keith M. Maxwell, M.D. (Oral Roberts, 1982); Amir A. Neshat, M.D. (Isfahan Univ., Iran, 1960); Michael A. H. Remar, M.D. (George Washington, 1985); Stephen K. Rerych, M.D. (Columbia, 1974); Henry E. Russell, M.D. (Northwestern, 1972); Guido F. Saldana, M.D. (Santo Domingo Univ., 1961); David J. Seel, M.D. (Tulane, 1948); Phillip P. Shaddock, M.D. (California, 1986); James P. Weaver, M.D. (Pennsylvania, 1969); James S. Wilson, Jr., M.D. (North Carolina, 1975).

Adjunct Assistant Professor: Stephen R. Petteway, Jr., Ph.D. (Alabama, 1980), Experimental Surgery.

Research Associates: Chin Ho Chen, Ph.D. (North Carolina, 1985); Penelope L. Davis, Ph.D., (Birmingham, 1992); Ahmed A. Farag, M.D. (Cairo, 1986); Guido Ferrari, M.D. (Genoa, 1985); Sanford Garner, Ph.D. (North Carolina, 1989); Gudrun Huper, M.A. (Stuttgart, 1966); Nathan S. Ihrcke, Ph.D. (Minnesota, 1991); Simon F. Lacey, Ph.D. (Imperial Coll. London, 1990); Seong-Wook Lee, Ph.D. (Cornell, 1994); Lynn M. Milich, Ph.D. (North Carolina, 1994); Robin S. Monroe, Ph.D. (Duke, 1989); Smitha K. Nair, Ph.D. (Tennessee, 1993); Kave N. Nikbakht, Ph.D. (Tennessee, 1986); Coreen Q. H. Oei, Ph.D. (Nat'l. Inst. Singapore, 1992); Angel Porgador, Ph.D. (Weizmann Inst. Sci., 1989); Laurence T. Rimskey-Clarke, Ph.D. (Paris, 1984); James P. Vaughn, Ph.D. (Virginia, 1991); Carl T. Wild, Ph.D. (Virginia Polytechnic, 1988); Jintao Zhou, Ph.D. (Shanghai, 1985); Jiying Zhou, Ph.D., (Chinese Pharm. Univ., Shenyang, 1984).

DIVISION OF THORACIC SURGERY

Professor Peter K. Smith, M.D. (Duke, 1977), *Chief*.

Professors: Mary and Deryl Hart Professor of Surgery Robert H. Jones, M.D. (Johns Hopkins, 1965); James E. Lowe, M.D. (California-Los Angeles, 1973); H. Newland Oldham, Jr., M.D. (Baylor, 1961); James B. Duke Professor David C. Sabiston, M.D. (Johns Hopkins, 1947); Ross M. Ungerleider, M.D. (Rush, 1976); Walter G. Wolfe, M.D. (Temple, 1963).

Associate Professor: Donald D. Glower, Jr., M.D. (Johns Hopkins, 1980).

Assistant Professors: Thomas A. D'Amico, M.D. (Columbia, 1987); Robert Duane Davis, M.D. (California, 1984); Francis Duhaylongsod, M.D. (Meharry, 1986); David H. Harpole, M.D. (Virginia, 1984); James Jaggars, M.D. (Nebraska, 1988); Kevin, P. Landolfo, M.D. (Manitoba, 1985); Ares D. Pasiopoularides, M.D., Ph.D. (Minnesota, 1971, 1972); Lloyd R. Smith, Ph.D. (Alabama, 1985).

Assistant Research Professors: Salah M. Abdel-Aleem, Ph.D. (City University of New York, 1988); James W. Davis, Ph.D. (Duke, 1993); Lawrence H. Muhlbaier, Ph.D. (North Carolina, 1981), Experimental Surgery.

Assistant Consulting Professors: Ralph S. Christy, Jr., M.D. (North Carolina, 1983); Calvin P. Claxton, M.D. (Virginia, 1961); F. Maxton Mauney, Jr., M.D. (Duke, 1959); Wayne H. Welscher, M.D. (SUNY-Upstate, 1975).

Research Associates: Chin Ho Chen, Ph.D. (North Carolina, 1985); Martha M. Demes, Ph.D. (Duke, 1984); Leslee J. Shaw, Ph.D. (St. Louis, 1994).

DIVISION OF NEUROSURGERY

Professor: Allan H. Friedman, M.D. (Illinois, 1974), *Chief*.

Professor Robert H. Wilkins, M.D. (Pittsburgh, 1959).

Associate Professors: Cecil O. Borel, M.D. (Hahnemann, 1977); Dennis A. Turner, M.D. (Indiana, 1975).

Associate Research Professor: Roger Madison, Ph.D. (Duke, 1981), Experimental Surgery.

Assistant Professors: Herbert E. Fuchs, M.D., Ph.D. (Duke, 1984); Timothy M. George, M.D., (New York, 1986); John P. Gorecki, M.D. (Queens, Canada, 1983); Michael M. Haglund, M.D., Ph.D. (Washington, 1987, 1988); William J. Richardson, M.D. (Eastern Virginia, 1977); Bruno J. Urban, M.D. (Germany, 1960).

Assistant Research Professor: Simon J. Archibald, Ph.D. (North Staffordshire Polytechnic, 1984).

Assistant Clinical Professor: Ziaur Rahman, M.B. (Prince of Wales Med. Coll., India, 1968).

Assistant Consulting Professors: Peter R. Bronec, M.D. (Duke, 1981); Bruce L. Kihlstrom, M.D. (North Carolina, 1972); Robert E. Price, Jr., M.D. (North Carolina, 1964).

Research Associates: Janice O. Levitt, Ph.D. (Temple, 1963); Robert D. Pearlstein, M.S. (North Carolina, 1978); Gowri K. Pyapali, Ph.D. (Nehru Univ., India, 1989); Darion Rapoza, Ph.D. (Chicago, 1990); Maria Rapazo, Ph.D. (Duke, 1994); Ashok K. Shetty, Ph.D. (All India Inst. Med. Sci., 1990).

DIVISION OF ORAL SURGERY

Assistant Professor: Thomas A. McGraw, D.D.S. (Pennsylvania, 1985).

Assistant Clinical Professor: Edward A. Dolan, D.D.S. (Maryland, 1971).

Assistant Consulting Professor: George A. Walsh, D.D.S. (Georgetown, 1972).

DIVISION OF ORTHOPAEDIC SURGERY

Virginia Flowers Baker Professor James R. Urbaniak, M.D. (Duke, 1962), *Chief*.

Professors: Frank H. Bassett III, M.D. (Louisville, 1957); William E. Garrett, M.D., Ph.D. (Duke, 1976); John M. Harrelson, M.D. (Duke, 1964); Donald E. McCollum, M.D. (Bowman Gray, 1953); James H. McElhaney, Ph.D. (West Virginia, 1964), Experimental Surgery; James A. Nunley, M.D. (Tulane, 1973).

Associate Professors: John A. Feagin, M.D. (Duke, 1961); Robert D. Fitch, M.D. (Duke, 1976); Richard D. Goldner, M.D. (Duke, 1974); William T. Hardaker, Jr., M.D. (Duke, 1973); L. Scott Levin, M.D. (Temple, 1982); William J. Richardson, M.D. (Eastern Virginia, 1977).

Assistant Professors: Reginald Hall, M.D. (Duke, 1983); Lloyd A. Hey, M.D. (Harvard, 1988); Stephen N. Lang, M.D. (Illinois, 1965); Salutario Martinez, M.D. (Havana, 1961); Barry S. Myers, M.D., Ph.D. (Duke, 1991); Sean P. Scully, M.D., Ph.D. (Rochester, 1986); Kevin P. Speer, M.D. (Johns Hopkins, 1985); T. Parker Vail, M.D. (Loyola, 1985).

Assistant Research Professors: Long-en Chen, M.D. (Peking Med. Coll., 1967), Ph.D. (Shanghai, 1983); Farshid Guilak, Ph.D. (Columbia, 1991).

Assistant Consulting Professors: Quinn H. Becker, M.D. (Louisiana State, 1956); Edward W. Bray III, M.D. (Med. Univ. South Carolina, 1971); William J. Callison, M.D. (Vanderbilt, 1953); Edwin B. Cooper, Jr., M.D. (Duke, 1966); J. Lawrence Frank, M.D. (Duke, 1965); H. John Gerhard, M.D. (Harvard, 1981); Stephen A. Grubb, M.D. (Northwestern, 1974); C. Robert Lincoln, M.D. (Med. Coll. Virginia, 1960); William J. Mallon, M.D. (Duke, 1984); Ronald J. Neimkin, M.D. (Cornell, 1975); William S. Ogden, M.D. (Med. Coll. Georgia, 1965); Theodore M. Pitts, M.D. (Yale, 1977); Edwin T. Preston, Jr. M.D. (Duke, 1960); Glydon B. Shaver, Jr., M.D. (Tennessee, 1961).

Consulting Associates: Richard F. Bruch, M.D. (Illinois, 1972); Albert T. Jennette, M.D. (North Carolina, 1959); Ronald A. Pruitt, M.D. (Med. Coll. Virginia, 1959); William A. Somers, M.D. (Duke, 1972).

Research Associates: Wen-ning Qi, M.D. (Peking Union Med. Coll., 1967); Anthony V. Seaber.

DIVISION OF OTOLARYNGOLOGY

Professor William J. Richtsmeier, M.D. (Case Western Reserve, 1975), Ph.D. (Med. Coll. of Wisconsin, 1975), *Chief*.

Professors: Joseph C. Farmer, Jr., M.D. (Duke, 1962); William R. Hudson, M.D. (Bowman Gray, 1951).

Associate Professors: Samuel R. Fisher, M.D. (Duke, 1975); Patrick D. Kenan, M.D. (Duke, 1959).

Associate Medical Research Professor: John H. Casseday, Ph.D. (Indiana, 1970).

Assistant Professors: Richard A. Clendaniel, Ph.D. (Alabama, 1992); Gregory F. Hulka, M.D. (Duke, 1988); Richard L. Scher, M.D. (Cincinnati, 1985); Debra L. Tucci, M.D. (Virginia, 1985).

Assistant Research Professors: David W. Smith, Ph.D. (Michigan, 1986); Christopher Van den Honert, Ph.D. (Case Western Reserve, 1979).

Assistant Consulting Professors: Beverly J. Adams, M.D. (Duke, 1977); Charles E. Clark III, M.D. (Michigan, 1968); Lynn A. Hughes, M.D. (Oklahoma, 1968); David J. Seel, M.D. (Tulane, 1948); Robert E. Taylor, M.D. (Alabama, 1976); C. Emery Williams, M.D. (Louisiana, 1963).

Adjunct Assistant Professors: Charles C. Finley, M.D. (North Carolina, 1983); Dewey T. Lawson, Ph.D. (Duke, 1972); Blake S. Wilson, B.S. (Duke, 1974).

Consulting Associates: Peter G. Chikes, M.D. (North Carolina, 1972); Edward V. Hudson, M.D. (Bowman Gray, 1962).

Research Associate: Shuwan Xue, Ph.D. (Boston, 1992).

DIVISION OF PLASTIC AND MAXILLOFACIAL SURGERY

Associate Professor L. Scott Levin, M.D. (Temple, 1982), *Chief*.

Professors: Robert M. Mason, D.M.D. (Kentucky, 1977), M.S.O. (North Carolina, 1979), Orthodontics; Galen W. Quinn, D.D.S. (Creighton, 1952), Orthodontics; Donald Serafin, M.D. (Duke, 1964).

Associate Professor: Gregory S. Georgiade, M.D. (Duke, 1973).

Associate Clinical Professor: Ronald Riefkohl, M.D. (Tulane, 1972).

Associate Consulting Professor: Verne C. Lanier, Jr., M.D. (Vanderbilt, 1966).

Assistant Professors: James A. Hoke, D.D.S. (Ohio State, 1972), M.S. (Michigan, 1976), Dentistry; L. Edmond F. Ritter, M.D. (Washington Univ., 1984); Gregory L. Ruff, M.D. (Michigan, 1978); Rainer E. Sachse, D.D.S., M.D. (Friedrich-Alexander Univ., 1981, 1983).

Assistant Clinical Professor: Martha A. Keels, D.D.S., M.S., Ph.D. (North Carolina, 1984, 1990), Dentistry.

Assistant Research Professor: Bruce M. Klitzman, B.S.E. (Duke, 1974), Ph.D. (Virginia, 1979).

Consulting Associate: James T. White, D.D.S. (Loyola, 1966), M.S. (North Carolina-Chapel Hill, 1976), Dentistry.

DIVISION OF UROLOGIC SURGERY

Professor David F. Paulson, M.D. (Duke, 1964), *Chief*.

Professors: E. Everett Anderson, M.D. (Duke, 1958); Lowell R. King, M.D. (Johns Hopkins, 1956); Glenn M. Preminger, M.D. (New York Med. Coll., 1977); Philip J. Walther, M.D., Ph.D. (Duke, 1975); George D. Webster, M.B., Ch.B. (Univ. Coll. Rhodesia, 1968); John L. Weinerth, M.D. (Harvard, 1967).

Associate Professor: Cary N. Robertson, M.D. (Tulane, 1977).

Associate Research Professor: Pei Zhong, Ph.D. (Texas-Southwestern, 1992).

Associate Consulting Professor: John H. Grimes, M.D. (Northwestern, 1965).

Assistant Professor: Craig F. Donnatucci, M.D. (Temple, 1979).

Assistant Research Professor: John W. Day, Ph.D. (Iowa, 1972).

Assistant Clinical Professor: Andrew F. Meyer, M.D. (New York, 1969).

Assistant Consulting Professors: Robert W. Andrews, M.D. (Bowman Gray, 1980); Niall J. Buckley, M.B., B.Ch. (Univ. Coll. Dublin, 1979); Hector H. Henry II, M.D. (Tulane, 1965); Raymond E. Joyner, M.D. (Bowman Gray, 1968); Wade S. Weems, M.D. (Duke, 1962); Arthur W. Whitehurst, M.D. (Virginia, 1968).

Clinical Associate: Steven H. Herman, Ph.D. (Duke, 1977).

DIVISION OF SPEECH PATHOLOGY AND AUDIOLOGY

Associate Professors: Frank DeRuyter, Ph.D. (Washington, 1978), *Chief*; David A. Koppenhaver, Ph.D. (North Carolina, 1991); Bruce A. Weber, Ph.D. (Illinois, 1966).

Associates: Burton B. King, M.A. (Northwestern, 1955); Robert G. Paul, Ph.D. (Oklahoma, 1969).

Assistant Professor: Karen A. Erickson, Ph.D. (North Carolina, 1965).

Adjunct Associate Professor: Robert G. Paul, Ph.D. (Oklahoma, 1969).

Emeriti: D. Bernard Amos, M.D.; John C. Angelillo, D.D.S., Lennox D. Baker, M.D.; Frank W. Clippinger, M.D.; Eugene D. Day, Ph.D.; Nicholas G. Georgiade, D.D.S., M.D.; J. Leonard Goldner, M.D.; Blaine S. Nashold, M.D.; Guy L. Odom, M.D.; William P. J. Peete, M.D.; Raymond W. Postlethwait, M.D.; Will C. Sealy, M.D.; James H. Semans, M.D.; William W. Shingleton, M.D.

Required Course

SUR-205C. Surgery. The required course in surgery is given in the second year and consists of an eight week clinical clerkship. The primary goal is the presentation of those concepts and principles which characterize the discipline of surgery. The fundamental features which form the foundation of surgical practice are presented at seminars three times weekly. The subjects discussed include antisepsis, surgical bacteriology, wound healing, inflammation, fluid and electrolyte balance, shock, the metabolic response to trauma, biology of neoplastic disease, gastrointestinal physiology and its derangements, and blood coagulation, thrombosis, and embolism.

The students are divided into two groups, one at Duke and the other at the Veterans Administration Medical Center, and each works with two members of the surgical faculty. Students are assigned patients on the surgical wards for diagnosis and management, and clinical rounds are made three times weekly with the faculty. A full-time teaching resident is assigned for the course in order to provide the students with continuous and readily available instruction at all times. A one hour session is devoted daily to demonstrations by the surgical specialties including neurosurgery, orthopaedics, otolaryngology, plastic surgery, and urology. The students attend a weekly session in experimental surgery, during which each student serves in rotation as the anesthesiologist, first assistant, and operating surgeon in performance of surgical procedures on experimental animals. Weight 8. *Sebastian*

Electives

SUR-227C. Advanced Urologic Clerkship. The diagnosis, management, and surgical treatment of patients with urologic disorders is stressed. Students are afforded intimate association with the entire staff in the clinics, wards, and operating rooms and participate in surgery. Cystoscopic and urographic diagnostic methods along with other

techniques are taught. Weight: 4 or 8 Max: 6. *Paulson, Anderson, King, Weinerth, Webster, Carson, Walther, and Robertson*

SUR-228C. Clerkship in Pediatric Urology. The course is designed to give an overview of urologic problems in the pediatric population. It includes patient contact and seminar material as well as ward and operating room experience in the diagnosis, treatment, and long-term follow-up of children with urologic disease. Weight: 4 Min: 1 Max: 2. *King*

SUR-230C. Seminar in Urologic Diseases and Techniques. Lecture/seminar course by members of the staff in Urology and Radiology providing an introduction to the spectrum of urologic diseases amplified by demonstration of urologic and radiologic diagnostic methodology. Clinical problems to be stressed include pediatric urology, obstructive uropathies, urinary calculi, male infertility, impotence, trauma, urodynamics, reconstructive urology, and urologic malignancies. Informal seminars given weekly. If permitted by the instructor, this clinical science course can be audited. Weight: 2 Min: 3 Max: 8. *Paulson, Anderson, King, Weinerth, Webster, Carson, Walther, Robertson, and Dunnick*

SUR-233C. Basic Neurosurgery Course. Disease conditions commonly encountered by neurosurgeons are presented. Clinical presentation of a disorder such as brain tumor or head injury is made by a member of the staff. Clinical features and plan of diagnostic investigation are stressed. The clinical disorder is used as a focal point from which to carry the presentation into the basic sciences that are related to the clinical problem. Prerequisites: student must have the approval of Dr. Cook to register for this course. Weight: 1 Min: 3 Max: 20. *Cook, Friedman, Fuchs, Turner, and Wilkins*

SUR-235C. Clinical Neurosurgery. The course is designed for those students with a career interest in one of the neurological sciences. Duties include the work up and care of inpatients, work up of clinic patients, assistance in the operating room, daily rounds, and night call. Weekly conferences are held in neurosurgery, neurology, neuropathology, and neuroradiology. There are also special lectures. Prerequisites: student must have the approval of Dr. Friedman to register for this course. Weight: 4 or 8 Max: 4. *Friedman, Wilkins, Fuchs, George, Gorecki, Hagland, and Turner*

SUR-236C. Intermediate Clinical Neurosurgery. This elective, intended as an intermediate experience between SUR-233C and SUR-235C, focuses on the clinical presentation of common neurosurgical disorders, radiographic evaluation, and therapeutic options including the indications and contraindications for surgical intervention. The student works up one to three patients and assists at their operations the following day either once or twice per week and attends the Saturday, neurosurgical conference. Prerequisites: permission of instructor. Weight: 1 or 2 Max: 1. *Wilkins*

SUR-237C. Investigative Neurosurgery. The student is assigned a project relating to neurologic sciences and, within reason, is provided with technical help, recording equipment, and experimental animals necessary for its completion. Each student plans and executes his own individual project with the help of the neurosurgery staff. Attendance at weekly conferences is also required. Prerequisites: SUR-235C suggested. The student must have the approval of Dr. Friedman and Dr. Turner to register for this course. Weight: 8 Max: 2. *Friedman, Fuchs, Gorecki, George, Hagland, Madison, and Wilkins*

SUR-239C. Clinical Otolaryngology. This course provides the student with a comprehensive survey of clinical otolaryngology. Duties include participation in both outpatient clinic activities and inpatient care in addition to assisting in the operating room. The student participates in ward rounds and in various conferences held by the division. Weight: 4 or 8 Max: 2. *Scher, Richtsmeier, Kenan, Cole, Farmer, Fisher, and McElveen*

SUR-240C. Otolaryngology Seminar. This conference and demonstration course provides an introduction to a variety of clinical problems in otolaryngology. Lectures

are supplemented with case presentations illustrating problems encountered in this field. If permitted by the instructor, this clinical science course can be audited. Weight: 1 Min: 4 Max: 6. *Richtsmeier*

SUR-241C. Surgical Intensive Care. This course is designed to broaden the student's knowledge and experience in dealing with critically ill patients. Under supervision, students function as sub-interns in the Surgical Intensive Care Unit (SICU). Students are assigned their own patients and actively participate in daily rounds as part of the SICU team. There is a morning lecture on aspects of critical care each day. Students take call one night in four and work on a one-on-one basis with SICU house staff in the supervised management of critically ill patients. Two weeks are spent in the SICU at Duke University Medical Center (trauma, vascular surgery, liver-kidney-pancreas transplantation, general surgery) and two weeks in the SICU at the Durham VA Medical Center (cardiothoracic and vascular surgery, general surgery). There is emphasis on teaching of procedures and techniques necessary for the management of all critically ill patients including hemodynamic assessment and monitoring, cardiovascular resuscitation and use of vasoactive drugs, ventilator management including ARDS, prevention and management of nosocomial infections, and nutritional support. Students are formally evaluated by the SICU house staff and the attending physician. C-L: ANE-241C. Weight: 5 Max: 8. *Reed, Sladen, and staff*

SUR-244C. Introduction to Plastic, Reconstructive and Maxillofacial Surgery. This course is designed for students who may have a future interest in plastic surgery. Duties include the preoperative evaluation of patients, assisting in the operating room, making daily ward rounds, and participation in conferences. Weight: 4. *Serafin, G. Georgiade, Ruff, Levin, Conner, and Ritter*

SUR-246C. Clerkship in Plastic and Reconstructive Surgery. The student participates in evaluation and management of plastic surgery patients including preoperative assessment, surgical assistance, and postoperative follow-up in a private office and at Durham Regional Hospital. Daily seminars cover core topics such as skin and surgical techniques, wound healing, and scars. Prerequisite: permission of instructor. Weight: 4 Max: 1. *Levin and Serafin*

SUR-247C. Plastic Surgery Research. Students are engaged in scholarly activities which are active, in-depth learning experiences related to microvascular, plastic, and/or reconstructive surgery. The students are expected to design, execute, and analyze data and to formulate hypotheses and draw conclusions from their projects. Weight: 1-8 Max: 4. *Klitzman, Serafin, Levin, and Ruff*

SUR-255C. Directed Study in Speech/Language Pathology and Audiology. Individual directed study in selected topics concerning normal and abnormal hearing, language and speech. In consultation with a faculty member, each student selects one or more areas of study. Emphasis is on fundamentals of normal and abnormal function, principles of evaluation, and management of disorders. Prerequisite: permission of instructor. Weight: 1. *DeRuyter and Weber*

SUR-259C. General Principles of Orthopaedics. A full experience on the Orthopaedic Service with duties and responsibilities similar to a first year resident. Inpatient care, outpatient examination, and operating room experience are included. Conference attendance is required. Individual or group discussions are conducted each day with attending staff/residents. The purpose of the course is to present broad concepts of orthopaedics to students planning general practice, pediatrics, allied surgical specialties, or orthopaedics. Weight: 4 or 8 Max: 5 for 4 weeks and 6 for 8 weeks. *Urbaniak, McCollum, Bassett, Harrelson, Hardaker, Nunley, R. Goldner, Garrett, Fitch, Lang, Richardson, Feagin, Hall, Speer, Vail, Levin, Scully, and Hey*

SUR-267C. Introductory Clinic Course in Children's Orthopaedics and Cerebral Palsy. This introductory clinic course is arranged for those interested in pediatric orthopaedic problems, neurological disease, and related fields. The course gives the student a working experience in the examination and evaluation of clinical out-patients, in-patients, and surgical patients. It demonstrates both the individual and multidisciplinary group approach to the whole patient with complex orthopaedic and neurologic conditions as they affect growth, development, and rehabilitation. Weight: 2 or 4 Max: 2. *Fitch and Lenox Baker Children's Hospital staff*

SUR-275C. Pediatric Cardiac Surgery. The student becomes an active member of the surgical team caring for infants and children with congenital heart defects. Responsibilities include ward work and participation during surgery. This student is involved in perioperative decision making. Weekly formal didactic sessions are conducted. Weight: 4 Max: 2. *Ungerleider*

SUR-276C. Advanced Clerkship in Pediatric Surgery. This course is designed to familiarize the student with the whole range of surgical problems in children, but with emphasis on the pathophysiology of surgical and related problems in the newborn infant and the total care of the child with a malignancy. The student is encouraged to participate fully in the patient care aspects of the service and is considered an integral part of the patient care team. Although the course may be taken for the full eight weeks, it is felt that a four week experience is probably optimal for most students. It may be combined with other advanced surgical clerkships such as SUR-299C or with four weeks of neonatology (PED-225C) or other courses depending on the interests of the student. Prerequisites: brief pre-enrollment interview with Dr. Keith Oldham. Weight: 4 or 8 Max: 2. *K. Oldham and Mahaffey*

SUR-277C. Orthopaedic Research. Individual projects are assigned for completion during a limited period of time. a student works with an investigator in the orthopaedic laboratory either at Duke Medical Center or the Durham Veterans Affairs Hospital. Clinical investigation studies are also available at both institutions. Prerequisite: Surgery 259C Weight: 8 Max: 4. *Urbaniak, orthopaedic senior staff, and house staff*

SUR-280C. General Surgical Oncology. The course is designed for the student interested in surgical oncology. The students are involved in patient care with a specific surgeon but, in addition, are expected to attend multidisciplinary conferences related to gastrointestinal and breast carcinoma. These multidisciplinary conferences involve medical and radiation oncology as well as surgical oncology. The student is also expected to evaluate surgical patients in an outpatient setting as well as participating in inpatient and operative patient care. This course is designed for students who have an interest in the basic sciences in relation to surgical oncology. Attendance at research conferences involved in the molecular and cellular biology of human cancers is also expected. Permission of instructor is required. Weight: 4 Min: 1 Max: 2. *Lyerly, Iglehart, Leight, Seigler, and Tyler*

SUR-281C. Introduction to Fractures and Musculoskeletal Trauma. Students participate in the emergency management of patients through the Duke Emergency Room or through Durham Regional Hospital. Principles of fractures and trauma are given during emergency room assignment. Attendance at Fracture Conference is required on Wednesdays and Saturdays at 7:30 a.m. in addition to two nights on call in the emergency room. Seeing patients in the Out-Patient Clinic one day per week is required. Weight: 3 Max: 4. *Urbaniak (Duke) and Staff/Chief of Orthopaedics (Durham Regional Hospital) and staff*

SUR-283C. Advanced Surgery—Emphasis Cardiovascular/Thoracic. Advanced concepts in surgery are presented in seminars and in ward, clinic, and operating room experiences. Fifty to seventy-five percent of the time is devoted to cardiovascular/tho-

racic surgery and related basic topics and the remainder to surgery generally. Weight: 8 Min: 2 Max: 5. *Wolfe, Anderson, Jones, Lowe, Sabiston, Smith, Ungerleider, and Young*

SUR-299C. Advanced Surgical Clerkship. This course is structured to provide the student with a comprehensive approach to surgical disorders. Each student works in the clinics, on the wards, and in the operating rooms side by side with *one* senior surgeon to be selected from the approved list below. Weight: 5 or 10. *Pappas, Bollinger, G. Georgiade, Glower, Grant, Iglehart, Jones, Leight, Lowe, Lysterly, Meyers, McCann, Oldham, Pappas, Sabiston, Sebastian, Seigler, Smith, Stickel, Ungerleider, Vaslef, and Wolfe*

SUR-301C. Emergency Department Surgical Care. Students desiring additional experience working with care of emergency surgical patients are assigned to the Emergency Department one night per week for each credit desired. They participate in the diagnosis and care of acute and traumatic surgical emergencies. Weight: 1-3 Max: 8. *Wellman*

SUR-302C. Family Practice/Traumatology. The student spends a portion of each day in the ski clinic triaging acute ski injuries and seeing family practice type problems coincident with a small community clinic. In addition, there is office practice in the physician's offices contiguous with St. John's Hospital, Jackson Hole, Wyoming under the directorship of Dr. Richard Sugden and Dr. Kenneth Lambert. Both are board certified in their specialties and hold university appointments. The unique opportunities of this travel away experience are to see the excellence that can be accomplished in a setting of this nature, to benefit from the mentorship of these outstanding individuals, and to add to experience in both family practice and orthopaedic traumatology. Weight: 4 Min: 1 Max: 1. *Sugden and Lambert*

SUR-303C. Trauma Service. This course is designed to provide students interested in trauma care with further experience both in the Emergency Department and on the Inpatient Trauma Service. The course emphasizes both triage and resuscitation for major and minor emergency problems in the Emergency Department and also pre- and postoperative care on the Inpatient Trauma Service. The student has a full-time experience by assuming duties and responsibilities similar to a junior intern. Emphasis is placed on developing skills in the care of patients with multisystem injuries in the Emergency Department, Inpatient Service, and Operating Room. Students work in conjunction with the attending staff and the residents on the Trauma Service. Weight: 4 Max: 2. *Reed, G. Georgiade, Sebastian, and Vaslef*

SUR-304C. Nutrition in the Hospitalized Patient. This course is designed to acquaint students with the techniques of nutritional assessment including somatic protein, visceral protein mass, body fat mass, immune competence, and metabolic balance studies. Students learn to determine basal energy expenditure and nitrogen requirements. The metabolic effects of acute and chronic starvation as well as stress and infection and the role played by these events in the hospital course of patients are studied. Emphasis is placed on techniques of nutritional support including routine and specialized hospital diets, routine and modular tube feeding diets, peripheral intravenous protein sparing and total parenteral nutrition. At the completion of the course, students have a thorough grasp of clinical nutrition and are able to apply specialized oral diets, tube feeding diets, and intravenous nutrition. If permitted by the instructor, this clinical science course can be audited. Weight: 1 Min: 3 Max: 8. *Grant*

Special Interdisciplinary Training Programs

ANESTHESIOLOGY AND ENVIRONMENTAL PHYSIOLOGY STUDY PROGRAM (AEP)

PROGRAM DIRECTORS: Kathryn P. King, M.D. (Coordinating Director), Richard Moon, M.D., Bryant W. Stolp, M.D., Ph.D., and David S. Warner, M.D.

While the university offers a range of opportunities from biochemistry to organ physiology, anesthesiology and critical care integrates these multiple systems into a larger perspective of human pathophysiology and pharmacology. Students have opportunities for research in cardiovascular and respiratory physiology, molecular pharmacology, neurobiology, and environmental science. Regardless of ultimate career choice, investigation in anesthesiology and critical care medicine provides strong basic science grounding and application of research principles.

An area of independent study is defined and a hypothesis proposed as part of an ongoing interaction between the student and the laboratory mentor. Necessary methodological skills are learned by the student early in the course of study to allow data acquisition for subsequent analysis and interpretation. As the year progresses, students participate in weekly "work in progress" seminars, also attended by members of the program faculty, that focus on the development of scientific information using the students' projects as examples. Emphasis is placed on experimental design and statistical analysis. At the end of the year, each student is expected to have completed a project of sufficient merit to warrant presentation and publication. Further, the Department offers a unique opportunity for the students to present their projects in a formal setting moderated by an external reviewer of national stature.

All students are required to take a fall overview course ANE-243B, "The Basic Science of Anesthesiology and Environmental Physiology" and a spring course ANE-244B, "Tutorial in Research Methods (Work in Progress)." Additional courses in Advanced Diving Physiology and Medicine will be available for interested students.

Students meet with the coordinating director weekly to monitor progress in the laboratory. The course directors meet on a monthly basis regarding course direction and the individual progress of students in the laboratories. The department chairman meets with the coordinating director and co-directors annually to discuss objective data such as publications, examinations, unpublished papers, and subjective data obtained in exit interviews.

FACULTY: Richard L. Auten, Jr., M.D.; Peter B. Bennett, Ph.D., D.Sc.; Cecil O. Borel, M.D.; Andrew T. Canada, Jr., Ph.D.; Kwen-Jen Chang, Ph.D.; Wayne A. Gerth, Ph.D.; Peter S. Glass, M.B., Ch.B.; Kathryn P. King, M.D.; Madan M. Kwatra, Ph.D.; Bruce J. Leone, M.D.; Richard Moon, M.D.; Claude A. Piantadosi, M.D.; Debra A. Schwinn, M.D.; Sidney A. Simon, Ph.D.; Thomas F. Slaughter, M.D.; Bryant W. Stolp, M.D., Ph.D.; Richard D. Vann, Ph.D.; David S. Warner, M.D.

BEHAVIORAL NEUROSCIENCES STUDY PROGRAM (BSP)

PROGRAM DIRECTOR: Everett H. Ellinwood, Jr., M.D.

This study program is designed to help third year medical students obtain an integrative understanding of the basic processes underlying normal and pathological human and laboratory animal behavior. The course and preceptorship offerings familiarize students with significant developments in the behavioral neurosciences, investigative methodology used to examine human behavior and its neurobiological underpinnings, and the application of these findings to medicine. As an example, they are provided with the neuroanatomical, histochemical, neuroimmunological, neuropharmacological, and neurobehavioral basis of prescribing anxiolytics, antidepressants, and other neurotropic drugs.

Students are encouraged to select an area of research concentration and then arrange to match their interests with a faculty member as a research preceptor by discussing the array of options with the study program director. They are given the opportunity to focus on some determinant of human behavior which may include neurobiological, developmental, or psychosocial factors. Students may choose to spend a significant portion of their time in a closely supervised laboratory with associated library research in an area of the student's interest resulting in a published report of the work. Specific science interests can be augmented through seminars, guided readings, and appropriate courses providing a greater familiarity with current issues in the biobehavioral sciences.

The following course work is required of all students: PSC-223B Neurobehavioral Basis of Behavior.

The courses listed below, although not required, are recommended for consideration:

PSC-360B Neuropharmacology
PHR-372B Cellular Endocrinology
NBI-270B Neurobiology
PSC-213B Human Development I. Birth through Adolescence
PSC-215B Comparative Personality Theory

Alternatives to the intensive laboratory research concentration are also offered. In addition to courses in the Department of Psychiatry, students may take courses offered through the Medical and Graduate Schools.

FACULTY: James A. Blumenthal, Ph.D.; Sheila Collins, Ph.D.; Everett H. Ellinwood, Jr., M.D.; Jau-Shyong Hong, Ph.D.; K. Ranga Krishnan, M.B., Ch.B.; Cynthia M. Kuhn, Ph.D.; James E. Lee, M.D.; Edward D. Levin, Ph.D.; David J. Madden, Ph.D.; Roy J. Mathew, M.B.B.S.; Jed E. Rose, Ph.D.; Saul M. Schanberg, M.D., Ph.D.; Susan S. Schiffman, Ph.D.; Rochelle D. Schwartz-Bloom, Ph.D.; Andrew Sherwood, Ph.D.; Kamaraju S. Sundar, Ph.D.; Richard S. Surwit, Ph.D.; Marvin Swartz, M.D.; Richard D. Weiner, M.D., Ph.D.; Redford B. Williams, M.D.

BIOMEDICAL ENGINEERING STUDY PROGRAM (BES)

PROGRAM DIRECTORS: Donald D. Glower, M.D. and James H. McElhaney, Ph.D.

This interdepartmental study program is designed to provide third year students with an opportunity to perform basic science research in the broad area of biomedical engineering. The program is designed to provide research opportunities to students interested in the quantitative understanding of the physiology of organs and organ systems. The majority of the faculty have research laboratories which investigate these areas at the macroscopic level. The course of study usually emphasizes either the employment of whole animal models or *in vitro* simulation of disease states. The development and employment of new instrumentation may be a component of the research effort, but not its exclusive objective. Emphasis in the student experience is placed upon the teaching of the quantitative method of understanding biological systems. The student is expected to learn to formulate hypotheses regarding biologic systems, to develop appropriate methods to test such hypotheses, and to use statistical methods to resolve the information obtained. Each student selects a faculty preceptor in consultation with the program director(s) and an individual research plan is developed. Students who wish to enter this program are not required to have an engineering background.

FACULTY: Roger C. Barr, Ph.D.; John A. Feagin, Jr., M.D.; Robert D. Fitch, M.D.; William E. Garrett, M.D., Ph.D.; Donald D. Glower, M.D.; Craig S. Henriquez, Ph.D.; Bruce M. Klitzman, Ph.D.; Bruce J. Leone, M.D.; L. Scott Levin, M.D.; James E. Lowe, M.D.; James H. McElhaney, Ph.D.; Barry S. Myers, M.D., Ph.D.; Ares D. Pasipoularides, M.D., Ph.D.; Robert Plonsey, Ph.D.; Debra A. Schwinn, M.D.; Peter K. Smith, M.D.; George A. Truskey, Ph.D.; Ross M. Ungerleider, M.D.; James R. Urbaniak, M.D.; Olaf T. von Ramm, Ph.D.; Patrick D. Wolf, Ph.D.

BIOMETRY STUDY PROGRAM (BMS)

PROGRAM DIRECTOR: William E. Wilkinson, Ph.D.

This study program offers students the opportunity to explore the quantitative and methodological principles of biostatistics and related disciplines in the context of a biomedical application. Most laboratories have two preceptors, a biostatistician and a clinical investigator, who are involved in a collaborative relationship using biostatistical techniques to address a clinical research question. In other laboratories, the preceptors are behavioral scientists and epidemiologists involved in cancer control and cancer epidemiology.

During the fall term, students are required to take one course, Probability and Statistical Inference (BTP-211B). This course provides a basic but thorough introduction to the concepts of biostatistics required in most biomedical applications. Most students also are expected to take one course during the spring term, Design of Etiological, Clinical and Experimental Studies (BTP-212B). Other electives may be taken with the approval of the student's preceptor(s) and the program director.

FACULTY: Scott R. Brazer, M.D., M.H.S.; Robert M. Califf, M.D.; G. Ralph Corey, M.D.; Elizabeth R. DeLong, Ph.D.; Kerry L. Lee, Ph.D.; Daniel B. Mark, M.D.; Colleen M. McBride, Ph.D.; Lawrence H. Muhlbaier, Ph.D.; Barbara K. Rimer, D.P.H.; Joellen M. Schildkraut, Ph.D.; Daniel J. Sexton, M.D.; Galen S. Wagner, M.D.; William E. Wilkinson, Ph.D.

BIOPHYSICS STUDY PROGRAM (BPP)

PROGRAM DIRECTOR: G. Allan Johnson, Ph.D.

This interdepartmental program provides an opportunity for medical students in the elective year to participate in research areas of basic and clinical medicine where quantitative and engineering methods are employed. The range of subject material included in the program is broad, ranging from the development of instrumentation to theoretical studies on chemical and physical mechanisms in biomedical systems. Some example areas are the development and application of new imaging techniques and the application of computer simulation to the study of biochemical and physiological systems.

Each student selects a faculty preceptor in consultation with the program directors and designs an individual plan in cooperation with the preceptor and directors. The primary emphasis of each student's plan is expected to be research. Students may, however, also be advised to take an existing course or to set up a tutorial with a faculty member to fill in deficient areas or to acquire needed quantitative or engineering skills. Depending on the subject area selected, a student may initiate a new research project of limited scope or take over a well-defined part of an existing project. Students are expected to produce a written summary of their work, possibly (but not necessarily) a paper suitable for publication in a scientific journal.

Students taking this program should have some prior training or experience in one or more of the following areas: mathematics, computer science, physics, chemistry, or engineering (electrical, mechanical, biomedical, etc.).

FACULTY: H. Cecil Charles, Ph.D.; Mark W. Dewhirst, D.V.M., Ph.D.; James T. Dobbins III, Ph.D.; Carey E. Floyd, Ph.D.; Laurence W. Hedlund, Ph.D.; Ronald J. Jaszczak, Ph.D.; Randy L. Jirtle, Ph.D.; G. Allan Johnson, Ph.D.; James R. MacFall, Ph.D.; Edward F. Patz, Jr., M.D.; Leonard D. Spicer, Ph.D.

CANCER BIOLOGY STUDY PROGRAM (CBP)

PROGRAM DIRECTORS: Edward C. Halperin, M.D. and Jonathan M. Horowitz, Ph.D.

The Cancer Biology Study Program offers third year medical students a thirty-two credit program of basic science instruction. Each student has an opportunity to focus on an area of interest and to pursue a scholarly activity. Through a combination of research preceptorship and classroom work, students are introduced to cancer research. The students may choose to investigate oncogenes, tumor suppressor genes, growth factors, chromosomal abnormalities, cellular invasion and metastases, tumor doubling time, cell loss, tumor hypoxia, tumor angiogenesis, chemical/ radiation/ foreign body/ viral/ tobacco carcinogenesis, biologic and immunotherapy principles, radiobiology and hyperthermic oncology, and the pharmacology of cancer chemotherapy.

All students are required to take the three credit course RON-228B, "The Basic Science of Oncology," during the fall semester. In the spring semester, students are required to take RON-230B, Selected Topics in the Basic Science of Oncology. In this one

credit seminar, students review selected topics in cancer biology. The remaining twenty-eight credits are earned through CBP-301B, Research in Cancer Biology.

Students meet individually and regularly with the program director(s) to discuss progress in the study program and review problems. The program director(s) meets regularly with preceptors to discuss the progress of students. All students have an exit interview to ascertain the strong and weak parts of the program in order to find ways of improving it for the subsequent group of students.

FACULTY: Andrew Berchuck, M.D.; Patrick J. Casey, Ph.D.; Mark W. Dewhirst, D.V.M., Ph.D.; Henry S. Friedman, M.D.; Stephen D. Garrett, Ph.D.; Eli Gilboa, Ph.D.; James M. Grichnik, M.D., Ph.D.; Edward C. Halperin, M.D.; Yusuf A. Hannun, M.D.; Maureane R. Hoffman, M.D., Ph.D.; Jonathan M. Horowitz, Ph.D.; Randy L. Jirtle, Ph.D.; Sally A. Kornbluth, Ph.D.; Joanne Kurtzberg, M.D.; Jeffrey R. Marks, Ph.D.; Lawrence B. Marks, M.D.; Joseph R. Nevins, Ph.D.; Michael C. Ostrowski, Ph.D.; Ann Marie Pendergast, Ph.D.; Salvatore V. Pizzo, M.D., Ph.D.; Hilliard F. Seigler, M.D.

CARDIOVASCULAR STUDY PROGRAM (CVS)

PROGRAM DIRECTOR: Harold C. Strauss, M.D.

This interdepartmental study program is designed to provide third year medical students with an in-depth basic science research experience in one area of the broad discipline of cardiovascular science. The program is directed at those students potentially interested in a career in cardiovascular research. Faculty members in this study tract come from numerous departments including biochemistry, cell biology, immunology, pathology, and pharmacology. Students who elect this study program undertake a research project in a laboratory under the guidance of a faculty preceptor. In addition, students are encouraged to take course work each term to complement their research interests. Because a wide range of research opportunities is available, course work is individually tailored by the faculty preceptor to the interests of the student.

FACULTY: Page A. W. Anderson, M.D.; G. Vann Bennett, M.D., Ph.D.; Perry J. Blackshear, M.D., Ph.D.; Marc G. Caron, Ph.D.; Frederick R. Cobb, M.D.; Samuel E. George, M.D.; Augustus O. Grant, M.B., Ch.B.; Joseph C. Greenfield, Jr., M.D.; Diane L. Hatchell, Ph.D.; Barton F. Haynes, M.D.; Bruce M. Klitzman, Ph.D.; William E. Kraus, M.D.; Madan M. Kwatra, Ph.D.; Robert J. Lefkowitz, M.D.; Ann LeFurgey, Ph.D.; Melvyn Lieberman, Ph.D.; Anthony R. Means, Ph.D.; Kevin G. Peters, M.D.; Claude A. Piantadosi, M.D.; Keith A. Reimer, M.D., Ph.D.; Debra A. Schwinn, M.D.; Jonathan Stamler, M.D.; C. Frank Starmer, Ph.D.; Gary L. Stiles, M.D.; Harold C. Strauss, M.D.; Antonius M. J. VanDongen, Ph.D.; Xiao-Fan Wang, Ph.D.; A. Richard Whorton, Ph.D.

CELL AND REGULATORY BIOLOGY STUDY PROGRAM (CRB)

PROGRAM DIRECTOR: George M. Padilla, Ph.D.

The CRB program is based on the application of contemporary experimental approaches of cell biology and genetics to the study of regulatory mechanisms in health and disease. It seeks to bridge the gap between research at the cellular/molecular and the tissue/organ level of organization.

Research areas represented in the CRB program fall into four broad categories:

Molecular properties and actions of peptide hormones, growth factors and their receptors: Studies on membrane biology, ligand-receptor interactions, and signal transduction; molecular mechanisms of insulin action and related growth factors (EGF and PDGF); and mechanisms of action of regulatory peptides on gastrointestinal target organs.

Genetic and biochemical regulation of membrane function, cytoskeletal elements, intracellular motility, and macromolecular trafficking: Studies on the motor complexes which drive organelle movements within cells during endocytosis, exocytosis, and axonal transport; intracellular function of unconventional myosins encoded by abm genes; and regulation of nucleocytoplasmic trafficking.

Genetic regulation of cell proliferation, growth, and development: The biochemical and functional properties of the recessive retinoblastoma oncogene; hormonal regulation of malignant cell growth; the molecular basis of cytokinesis; the role of fetal and placental

hormones in the regulation of fetal growth and oogenesis; molecular basis of morphogenetic changes using genetic and transgenic methods; and the role of cyclins in mitotic and meiotic events in relation to cell cycle specific kinases.

Regulation of integrated physiological processes: Investigations on the role of atrial natriuretic factors in blood volume and arterial pressure regulation; the role of intracellular second messengers in ionic and metabolic regulation; regulation of chloride channels in epithelial cells; regulatory mechanisms of tissue oxygen concentration and oxidant damage; organization and control of intermediary metabolism pathways; neural regulation of gonadotropin function; and genetic regulation of intermediary metabolism in response to metabolic demands on striated muscle (myocytes).

The major emphasis of the CRB program is on student-generated, independent study/research projects conducted in a close association with a faculty preceptor. Students are encouraged to enroll in basic science courses or relevant clinical offerings which contribute to their research projects or their future career goals. The research colloquia and self-learning course offerings, as described below, are equally important components of the CRB program.

For all students, the program consists of the following:

Individual Tutorial (CBI-219). This is carried out under the supervision of a faculty preceptor selected by each student with the approval of the program director. Students are expected to complete their tutorial arrangements before entering the program. The program director directs the students to appropriate faculty preceptors and evaluates the proposed research projects.

Research Presentations. At the beginning of the fall semester, students give a brief presentation on their proposed research to the CRB participants. This presentation and a short research report is a formal requirement of all participants. Toward the end of spring semester, students present their research results before the group in the form of a platform presentation.

Research Reports. Coincident with the research presentations, students submit two written reports to the program director on their research projects. The preliminary report is submitted before the end of the fall semester. It consists of a brief review of the literature, a discussion of the hypothesis to be tested, specific aims of the proposed research, and a brief assessment and justification of the methodologies that are to be employed. The final report, submitted towards the end of the spring semester, is written in the form of a research paper being submitted for publication. It should include a more extensive review of the literature and an evaluation and discussion of the results obtained. The colloquia and research reports provide an opportunity for medical students to develop communication and presentation skills for their biomedical careers.

FACULTY: Onyekwere E. Akwari, M.D.; Nels C. Anderson, Jr., Ph.D.; Peter B. Bennett, Ph.D., D.Sc.; Perry J. Blackshear, M.D., Ph.D.; J. Joseph Blum, Ph.D.; Andrew T. Canada, Jr., Ph.D.; Marc G. Caron, Ph.D.; Jonathan A. Cohn, M.D.; Arturo De Lozanne, Ph.D.; Marc K. Drezner, M.D.; J. Gregory Fitz, M.D.; Michael Freemerk, M.D.; William E. Garrett, M.D., Ph.D.; Yusuf A. Hannun, M.D.; Jonathan M. Horowitz, Ph.D.; J. Dirk Iglehart, M.D.; Daniel P. Kiehart, Ph.D.; William E. Kraus, M.D.; Cynthia M. Kuhn, Ph.D.; Rodger A. Liddle, M.D.; Allen W. Mangel, M.D., Ph.D.; Tobias Meyer, Ph.D.; Thomas M. Murphy, M.D.; Christopher V. Nicchitta, Ph.D.; Theresa J. O'Halloran, Ph.D.; George M. Padilla, Ph.D.; Cary N. Robertson, M.D.; Patricia Saling, Ph.D.; David W. Schomberg, Ph.D.; Sean P. Scully, M.D., Ph.D.; Michael P. Sheetz, Ph.D.; Shirish Shenolikar, Ph.D.; Bryant W. Stolp, M.D., Ph.D.; Katherine I. Swenson, Ph.D.; Margaret A. Titus, Ph.D.; E. Lee Tyrey, Ph.D.; Steven R. Vigna, Ph.D.; Judith A. Voynow, M.D.; David K. Walmer, M.D., Ph.D.; Jo Rae Wright, Ph.D.; Heather N. Yeowell, Ph.D.

EPIDEMIOLOGY, HEALTH SERVICES, AND HEALTH POLICY STUDY PROGRAM (EHS)

PROGRAM DIRECTOR: Laurence G. Branch, Ph.D.

With increased emphasis on the true outcomes of clinical care, there is a gap in the training of physicians to meet the following goals: (a) physician-researchers who initiate studies to determine the optimal clinical practice and the optimal uses of expensive

technology, and (b) providers of data to research studies and the need to understand the appropriate data-collection procedures as well as the fit of the data into the overall picture of clinical research and care of the patient.

The Epidemiology, Health Services, and Health Policy Study Program is designed to provide knowledge regarding research tools to third year Duke medical students to design prospective clinical trials and to analyze the emerging health services research data. Participants also learn the essentials of health policy and comparative health systems so that they can be contributors to the improvement of the system of health care, beginning with the improved health of the patient but extending to local, state, and national issues.

Program Overview

After satisfactory completion of the courses, practicum, and independent research detailed below, participants in the Epidemiology, Health Services, and Health Policy Study Program are granted a total of thirty-two basic science credits for their work. Students in this program may also work toward a master's degree in Health Policy, but this requires an entire year of study.

Courses. The EHS study program offers courses in the areas listed below. One course is required: Principles of Epidemiology. Other electives may be substituted with the approval of the program directors. Third year students in other study programs may elect to take the courses listed if space is available and permission is given by the third year mentors.

Principles of Epidemiology (CFM-239B)

Introduction to Health Care Policy Analysis (PPS-264S)

Probability and Statistical Inference (BTP-211)

Health Care Finance

Practicum. Each student works in an epidemiology/health services/health policy independent research activity (for example, illness causology and outcome, decision analysis, health economics, or medical center financial operations). This occupies at least 50 percent of the student's time through the nine months and usually occupies more depending on the election of courses.

Required Research. In conjunction with the practicum, each student is required to produce an in-depth research paper analyzing an area of epidemiology, health service research, finance, health systems, or health policy, most probably related to the student's practicum experience. He or she works with an advisor to determine and investigate the topic. This research activity extends throughout the nine months, accumulating with the acceptance of the completed paper.

FACULTY: Dan G. Blazer, M.D., Ph.D.; Laurence G. Branch, Ph.D.; Scott R. Brazer, M.D., M.H.S.; Barbara J. Burns, Ph.D.; Robert M. Califf, M.D.; Dennis A. Clements, M.D., Ph.D.; John M. Dement, Ph.D.; Linda K. George, Ph.D.; Deborah T. Gold, Ph.D.; Ronnie D. Horner, Ph.D.; Robert H. Jones, M.D.; George L. Maddox, Ph.D.; David B. Matchar, M.D.; Leonard R. Prosnitz, M.D.; Barbara K. Rimer, D.P.H.; Joellen M. Schildkraut, Ph.D.; David L. Simel, M.D., M.H.S.; Marvin S. Swartz, M.D.

IMMUNOLOGY STUDY PROGRAM (ISP)

PROGRAM DIRECTOR: Frances E. Ward, Ph.D.

This program is designed for students whose career goals lie in one of the many clinical specialties that interface broadly with immunology, allergy-immunology, infectious diseases, rheumatology, hematology, transplantation, and oncology. A basic but thorough introduction to immunology is developed in IMM-291B, which also emphasizes critical discussion of original research papers; a further and more clinically oriented analysis is provided in the core course IMM-330B, Medical Immunology, which emphasizes the role of immunologic mechanisms in various human disease states. Each student chooses a faculty preceptor with whom to work on an original research project. It is encouraged that the student not be merely injected into the continuum of the preceptor's

research interests, but rather that an individual project be developed which can be completed during the study program. The primary goals of the program are to encourage and develop the student's own creativity, to expose him or her to the research interests and philosophies of the entire Department of Immunology, and to help gain a useful personal perspective on current immunologic thought with an emphasis on clinical relevance. The student's efforts and time are generally divided as follows:

Preceptorship. The major emphasis of the program during which the students function much as graduate students in the Department of Immunology. (30 hours or more per week).

Comprehensive Immunology (IMM-291B). An in-depth course in the basic concepts of immunology. Analysis of antigens and antibodies is followed by an emphasis on the organization and cellular and molecular aspects of the immune system, its regulation, and effector mechanisms. (4 hours per week, fall term).

Medical Immunology (IMM-330B). A brief review of basic concepts of immunology is followed by in-depth discussions of the role of immune mechanisms in the pathogenesis and treatment of human diseases. Principal emphasis is placed on immune deficiency diseases, hypersensitivity, alloimmunity, transplantation, infectious diseases, autoimmunity, tumor immunology, and immunohematology. When applicable, the classes include patient presentations and laboratory demonstrations. The course meets daily permitting each disease state to be covered in considerable depth. (5 hours per week, spring term).

Seminars for Research Progress. Throughout the year, fellows and students in the department present brief informal seminars on their ongoing research. The discussion that follows is of great help to the presenter and allows the student to observe and participate in critical analysis of research before it is at the publication or formal seminar stage. (1 hour per week).

Immunology Department Seminars. A series of formal seminars by department faculty and visiting scientists. (1-2 hours per week).

Additional Course Work. The student may elect to take any of several courses in immunology and related fields, but is generally discouraged from excessively diluting his laboratory experience.

FACULTY: R. Randal Bollinger, M.D., Ph.D.; Dani P. Bolognesi, Ph.D.; Rebecca H. Buckley, M.D.; Jeffrey R. Dawson, Ph.D.; Carolyn Doyle, Ph.D.; Eli Gilboa, Ph.D.; Russell P. Hall, III, M.D.; Barton F. Haynes, M.D.; Maureen R. Hoffman, M.D., Ph.D.; Donna D. Kostyu, Ph.D.; Michael S. Krangel, Ph.D.; Roger J. Kurlander, M.D.; Joanne Kurtzberg, M.D.; M. Louise Markert, M.D., Ph.D.; Michael G. McHeyzer-Williams, Ph.D.; Thomas J. Palker, Ph.D.; David S. Pisetsky, M.D., Ph.D.; Jeffrey L. Platt, M.D.; William J. Richtsmeier, M.D., Ph.D.; Wendell F. Rosse, M.D.; Hilliard F. Seigler, M.D.; Michael F. Seldin, M.D., Ph.D.; Ralph Snyderman, M.D.; Thomas F. Tedder, Ph.D.; Marilyn J. Telen, M.D.; Frances E. Ward, Ph.D.; Yuan Zhuang, Ph.D.

INFECTIOUS DISEASES STUDY PROGRAM (IDP)

PROGRAM DIRECTOR: Thomas G. Mitchell, Ph.D.

Knowledge of infectious diseases is relevant to care of patients of all ages and in each clinical specialty from surgery, pediatrics, and medicine to obstetrics-gynecology and family medicine. This study program is designed to provide students with the opportunity to directly explore infectious diseases in a laboratory setting coupled with lecture/seminar courses designed to provide some breadth of knowledge of the host, microorganism, and their interactions. The goals of the program are to instill a critical assessment of information, to provide the opportunity for creative acquisition of data, to encourage independent thinking, and to provide insight into modern technology and the interrelationship of clinical infectious diseases with basic microbiology and immunology. Most of the participating faculty members are involved in research that relates to microbial pathogenesis.

Each student selects a faculty preceptor with whom to work on an original research project. The student is expected to develop her or his own project within the framework of an existing laboratory, but designs her or his own experiments, critically assesses the relevant literature, learns to evaluate data, and has the opportunity to solve the problems associated with the project. Appropriate guidance and assistance are provided by the faculty and others within the laboratory setting.

Preceptorship. This is the major emphasis of the program with students functioning essentially as graduate students. 30 hours or more per week.

Courses. During the spring term, students may take either Medical Immunology (MIC-330B) or Virology and Viral Oncology (MIC-252B), depending on the student's laboratory research interests.

Seminars. Students in the Infectious Diseases Study Program attend a weekly seminar in which faculty members, fellows, and students present their ongoing research. Such presentations enable the student to observe and participate in critical analysis of research before it reaches the publication stage.

Additional Course Work. Although other basic science electives in microbiology and immunology may be taken upon approval by the program director, the student is discouraged from excessively diluting her or his laboratory experience.

FACULTY: Kenneth Alexander, M.D., Ph.D.; Dani P. Bolognesi, Ph.D.; Rebecca H. Buckley, M.D.; Vickers Burdett, Ph.D.; Richard Frothingham, M.D.; Mariano A. Garcia-Blanco, M.D., Ph.D.; John D. Hamilton, M.D.; Wolfgang K. Joklik, D.Phil.; Jack D. Keene, Ph.D.; Kenneth N. Kreuzer, Ph.D.; Roger J. Kurlander, M.D.; John H. McCusker, Ph.D.; Thomas G. Mitchell, Ph.D.; Joseph R. Nevins, Ph.D.; Thomas J. Palker, Ph.D.; John R. Perfect, M.D.; David J. Pickup, Ph.D.; Christian R.H. Raetz, M.D., Ph.D.; Daniel J. Sexton, M.D.; J. Brice Weinberg, M.D.; Kenneth H. Wilson, M.D.

NEUROBIOLOGY STUDY PROGRAM (NBP)

PROGRAM DIRECTORS: Nell Beatty Cant, Ph.D. and Dennis A. Turner, M.D.

Through the Neurobiology Study Program, students may examine the nervous system at many levels. Areas of study include neuroanatomy, neurochemistry, neuropharmacology, neurophysiology, and developmental neurobiology, as well as the neurobiology of a number of important diseases. Faculty in the study program are engaged in research that ranges from the molecular to the systems level. The program emphasizes a basic research experience or tutorial under the guidance of a preceptor, a weekly research seminar, and the opportunity to audit appropriate neurobiology courses during the year.

Research Experience. The basic component of the NBP Study Program is an in-depth research experience in a basic science laboratory under the supervision of one of the participating faculty. Involvement in the research process can be at several levels. Most students wish to work full-time in a laboratory pursuing an independent research project, including an analysis of experiments and communication of the results. Students in this category who wish to attend courses are usually advised to audit them. Other students may wish to combine a part-time research experience with extensive course work. The appropriate level for each student should be determined in consultation with the study program directors and the research mentor. All students are expected to prepare written statements of their goals for the year with a detailed plan for accomplishing these goals. This could take the form of stating the problem to be studied, the hypotheses, and an outline of the work to be done. A final report is required and may take the form of a research paper or literature review. Publication is not required, but many students have been successful in publishing a report with their preceptors.

Seminar. Students enrolled in the program meet weekly with the program directors and mentors for an informal seminar. In the beginning of the fall term, seminars focus on the planned projects of each student. At the end of the spring semester, the seminar focuses on work accomplished as each student presents a report of her or his research. During the rest of the year, invited speakers are asked to address particular topics of interest to be decided upon by the group.

FACULTY: George J. Augustine, Ph.D.; Jorge V. Bartolome, Ph.D.; Rose-Mary Boustany, M.D.; Nell B. Cant, Ph.D.; Joseph M. Corless, M.D., Ph.D.; Gillian Einstein, Ph.D.; Robert P. Erickson, Ph.D.; David Fitzpatrick, Ph.D.; William C. Hall, Ph.D.; Michael M. Haglund, M.D., Ph.D.; David A. Hosford, M.D., Ph.D.; Lawrence C. Katz, Ph.D.; Julie C. Kauer, Ph.D.; Cynthia M. Kuhn, Ph.D.; Anthony S. LaMantia, Ph.D.; Darrell V. Lewis, Jr., M.D.; Donald C. Lo, Ph.D.; Roger D. Madison, Ph.D.; William D. Matthew, Ph.D.; James O. McNamara, Sr., M.D.; J. Victor Nadler, Ph.D.; Dale Purves, M.D.; Peter H. Reinhart, Ph.D.; Allen D. Roses, M.D.; Saul M. Schanberg, M.D., Ph.D.; Donald E. Schmechel, M.D.; Rochelle D. Schwartz-Bloom, Ph.D.; Sidney A. Simon, Ph.D.; J. H. Pate Skene, Ph.D.; Theodore A. Slotkin, Ph.D.; George G. Somjen, M.D.; John E.R. Staddon, Ph.D.; Warren J. Strittmatter, M.D.; Dennis A. Turner, M.D.; E. Lee Tyrey, Ph.D.; Jeffery M. Vance, M.D., Ph.D.; Wilkie A. Wilson, Jr., Ph.D.; Fulton Wong, Ph.D.

OPHTHALMOLOGY AND VISUAL SCIENCE STUDY PROGRAM (OVS)

PROGRAM DIRECTORS: David L. Epstein, M.D. and Fulton Wong, Ph.D.

Description. The purpose of this study program is to provide third year medical students with research skills and experience that can be applied to future careers as clinician scientists in ophthalmology and other fields. Although there is a primary emphasis on laboratory science, clinical research programs of inquiry based on strong scholarship are also possible. There is a focus on clinical investigators forming a true partnership with basic science researchers in attempting to advance the understanding and therapy of ocular diseases. There is an emphasis on hypothesis formation and the planning and execution of experiments that can address and then redefine the hypothesis.

Curriculum. Each student chooses a preceptor according to her/his interests. Together they determine a topic of investigation which requires hands-on laboratory or clinical research by the student. Joint preceptors (for example, a clinical investigator and a basic science researcher) are acceptable and, in fact, encouraged. The course of study must be approved by the study program directors. At the end of the year, each student is expected to produce an in-depth paper based on the research. Throughout the year students attend: (a) regular lectures on topics about ophthalmology and visual science given by Duke faculty as well as outside lecturers; (b) participate in bimonthly research workshops in which students and faculty make presentations of hypotheses, assumptions therein, methods, and results; and (c) give formal presentations of research work at the conclusion of the year.

Research Opportunities. Opportunities include research in physiology, pathology, and molecular and cell biology of the eye as they relate to eye diseases. Opportunities also exist in biophysics and instrumentation, laser cell biology, and scientific basis of glaucoma, corneal, and retinal diseases.

FACULTY: R. Rand Allingham, M.D.; Tared Borrás, M.D.; Edward G. Buckley, M.D.; Joseph M. Corless, M.D., Ph.D.; Monica A. DeLaPaz, M.D.; Irving T. Diamond, Ph.D.; Gillian Einstein, Ph.D.; David L. Epstein, M.D.; W. Craig Fowler, M.D.; Diane L. Hatchell, Ph.D.; Glenn J. Jaffe, M.D.; Gordon Klintworth, M.D., Ph.D.; Brooks W. McCuen, II, M.D.; E. Timothy O'Brien, Ph.D.; Alan D. Proia, M.D., Ph.D.; Judy H. Seaber, Ph.D.; M. Bruce Shields, M.D.; Cynthia A. Toth, M.D.; Fulton Wong, Ph.D.

PATHOLOGY STUDY PROGRAM (PSP)

PROGRAM DIRECTORS: William D. Bradford, M.D. (Coordinating Director), Keith A. Reimer, M.D., Ph.D., and Maureane R. Hoffman, M.D., Ph.D.

Pathology is the study of disease through the utilization of structural and functional changes to gain information about the human organism's response to injury. The goal of the Pathology Study Program is to provide the medical student with a thorough learning experience in the anatomical basis of disease under the guidance of a senior faculty preceptor. The essential elements of this program are: (a) organized course work, (b) independent, but guided research experience (bench or library), and (c) active participation in small group seminars.

To meet the diverse interests and needs of Duke medical students, there are three tracks within the Pathology Study Program. All curriculum plans must be approved and signed by Dr. Bradford

PSP Track I

Required Courses:	Systemic pathology; didactic lectures (PTH-241B); student seminars
Elective Courses:	None
Independent Study:	Research with thesis / project report required
Advisor:	Dr. Keith A. Reimer (684-3659)
Max number students:	4

PSP Track II

Required Courses:	Systemic pathology; didactic lectures (PTH-241B); autopsy, surgical, or cytopathology rotation (PTH-223B, PTH-348B, PTH-281B); student seminars
Elective Courses:	Limited
Independent Study:	Thesis / project report required
Advisor:	Dr. Maureane R. Hoffman (684-6925)
Max number students:	4

PSP Track III

Required Courses:	Systemic pathology; didactic lectures (PTH-241B); student seminars; autopsy, surgical or cytopathology rotation (PTH-223B, PTH-348B, PTH-281B)
Elective Courses:	A carefully planned selection of preceptorships, e.g., molecular pathology, microbiology, surgical pathology, autopsy pathology, or transfusion medicine selected with the advice of Dr. Bradford.
Independent Study:	Thesis / project report required
Advisor:	Dr. William Bradford (684-5112)
Max number students:	2

Advisory Plan for Pathology Study Program. The Department of Pathology participates in the Medical School orientation to the third year. Following the general information session, interested students may meet with advisors to establish interviews for individual mentors. Every student must have a study program advisor and an individual mentor. The curriculum plan, academic schedule, and registration cards of each student selected for the Pathology Study Program must be reviewed and approved by Dr. Bradford prior to registration.

FACULTY: Rex C. Bentley, M.D.; Darell D. Bigner, M.D., Ph.D.; Sandra H. Bigner, M.D.; Edward H. Bossen, M.D.; William D. Bradford, M.D.; Stephen J. Bredehoeft, M.D.; Dennis A. Clements, M.D., Ph.D.; James D. Crapo, M.D.; Mark W. Dewhirst, D.V.M., Ph.D.; John A. Feagin, Jr., M.D.; Marcia R. Gottfried, M.D.; Charles S. Greenberg, M.D.; Laura P. Hale, M.D.; Maureane R. Hoffman, M.D., Ph.D.; David Howell, M.D., Ph.D.; Peter D. Issitt, Ph.D.; Robert B. Jennings, M.D.; Randy L. Jirtle, Ph.D.; William W. Johnston, M.D.; William H. Kane, M.D., Ph.D.; Gordon Klintworth, M.D., Ph.D.; Roger J. Kurlander, M.D.; Lester Layfield, M.D.; James E. Lowe, M.D.; Herbert K. Lyerly, M.D.; Neil R. MacIntyre, M.D.; John F. Madden, M.D., Ph.D.; Sara E. Miller, Ph.D.; Salvatore V. Pizzo, M.D., Ph.D.; Alan D. Proia, M.D., Ph.D.; L. Darryl Quarles, M.D.; Keith A. Reimer, M.D., Ph.D.; L. Barth Reller, M.D.; Victor L. Roggli, M.D.; Wendell F. Rosse, M.D.; Frank Sedor, Ph.D.; John D. Shelburne, M.D., Ph.D.; Joachim R. Sommer, M.D.; Charles Steenbergen, M.D., Ph.D.; John G. Toffaletti, Ph.D.; S. Thomas Traweek, M.D.; Robin T. Vollmer, M.D.; Philip J. Walther, M.D., Ph.D.; J. Brice Weinberg, M.D.; Frances K. Widmann, M.D.; Peter Zwadyk, Jr., Ph.D.

ROSTER OF HOUSE STAFF BY DEPARTMENTS

Anesthesiology

Chief Residents 1996-1997: Steven Dentz, M.D. (Michigan, 1993); Albert Hasson, M.D. (Washington, 1993).

Senior Residents: Stuart Cohen, M.D. (UMDNJ, 1992); Susan Drelich, M.D. (Tufts, 1993); Forest Evans, M.D. (South Carolina, 1993); Anne Marie Fras, M.D. (Michigan, 1993); Mark Gerhardt, M.D. (Michigan, 1992); Steven Hill, M.D. (Vanderbilt, 1986); Eugene Moretti, M.D. (Temple, 1993); Jennifer Root, M.D. (Alabama, 1993); Robert Strehlow, M.D. (Texas-Southwestern, 1993); Christopher Watke, M.D. (Duke, 1993); Todd Wheaton, M.D. (Tennessee, 1993).

Junior Residents: Arthur Bergh, M.D. (Texas-Houston, 1993); John Campbell, M.D. (Pittsburgh, 1995); Amy Connelly, M.D. (Texas-San Antonio, 1994); Libby Dalamangas, M.D. (New Jersey, 1994); Christopher East, M.D. (SUNY-Buffalo, 1995); Maribel Gamoso, M.D. (Albany, 1995); James Gould, M.D. (SUNY, 1994); Davida Grossman, M.D. (Stanford, 1994); Adil Kamal, M.D. (King Abdulaziz, Saudi Arabia, 1992); Neeti Kohli, M.D. (Christian Med. Coll., India, 1992); David Lindsay, M.D. (Maryland, 1994); Brock Milliken, M.D. (Kentucky, 1995); Thomas Powell, M.D. (Texas-San Antonio, 1995); Stephen Rogers, M.D. (South Alabama, 1994); Scott Sauer, M.D. (Michigan, 1994); Timothy Stanley, M.D. (FUHS, Chicago Medical School, 1995).

Community and Family Medicine

Chief Residents: Yuri O. Bermudez, M.D. (Nicaragua, 1991); Jill P. Burmeister, M.D. (Michigan, 1993); James H. Shepherd, M.D. (Bowman Gray, 1994).

Residents: Grace Ayscue, M.D. (North Carolina, 1994); Brent A. Beaird, M.D. (Emory, 1995); Alexander G. Benz, M.D. (Albany, 1995); Sara B. Beyer, M.D. (North Carolina, 1995); Anna R. Boorse, M.D. (Temple, 1995); B. Will Curtis, M.D. (Ohio State, 1996); Michael C. Diem, M.D. (UMDNJ, 1996); Kristina Disbrow, M.D. (Albany, 1994); Chyke A. Doubeni, M.D. (Nigeria, 1987); Andrew J. Fallis, M.D. (Albany, 1996); L. Michelle Fleeman, M.D. (East Carolina, 1996); Tara L. Frenkl, M.D. (UMDNJ, 1996); W. Bradley Gates, M.D. (Texas-Southwestern, 1995); Miroslav Gavazov, M.D. (Bulgaria, 1982); Corinne Griffith, M.D. (Virginia, 1993); Sumera Hayat, M.D. (Jefferson, 1995); Adrienne M. Kelly, M.D. (Texas A&M, 1996); Brian M. Lee, M.D. (Michigan, 1995); Ragini T. Madan, M.D. (India, 1982); Alexei Radiontchenko, M.D. (Russia, 1988); Keith G. Ramsey, M.D. (Meharry, 1995); Ivan Savitsky, M.D. (Wayne State, 1994); Stephen L. Schmidt, M.D. (North Carolina, 1995); Margaret E. Simpson, M.D. (West Indies, 1987); David B. Tsai, M.D. (Temple, 1996); Peter C. Vitanzo, M.D. (Temple, 1996); Bo Wu, M.D. (China, 1985).

Medicine

Chief Residents: Murray Abramson, M.D. (Duke, 1991); Kevin M. McGrath, M.D. (Jefferson, 1992).

Senior Assistant Residents: Amy P. Abernethy, M.D. (Duke, 1994); Zakaria I. Assi, M.D. (Beirut, 1994); Kimberly L. Blackwell, M.D. (Mayo, 1994); Richard S. Bloomfeld, M.D. (Washington Univ., 1994); Paul R. Bohjanen, M.D. (Michigan, 1993); Christopher H. Cabell, M.D. (Duke, 1994); Christopher F. Carpenter, M.D. (Michigan, 1994); Cathleen S. Colon-Emeric, M.D. (Johns Hopkins, 1994); Mark R. Dumais, M.D. (Harvard, 1994); Mark W. Feinberg, M.D. (Med. Coll. Pennsylvania, 1994); Douglas S. Files, M.D. (Wayne State, 1994); Tejal K. Gandhi, M.D. (Harvard, 1994); John P. Gassler, M.D. (Mount Sinai, 1994); Stacy D. Gittleson, M.D. (Maryland, 1993); Magnus Gottfredsson, M.D. (Iceland, 1991); Kenneth C. Goldberg, M.D. (Med. Coll. Wisconsin, 1994); Reem M. Haddad, M.D. (New Mexico, 1994); Henry L. Harrell, M.D. (Vanderbilt, 1994); Mitchell T. Heflin, M.D. (Virginia, 1993); Wenson Hsieh, M.D. (Johns Hopkins, 1994); Khuda-Dad Khan, M.D. (Nishtar Med. Coll., 1984); Muhammad N. Khattak, M.D. (Aga Khan, 1992); Joseph B. Khoury, M.D. (Virginia, 1994); Preston S. Klassen, M.D. (Nebraska, 1994); Li Kuo Kong, M.D. (Washington Univ., 1994); Linda K. Lang, M.D. (Maryland, 1994); William I. Mariencheck, M.D. (Washington Univ., 1994); Robert Martell, M.D. (Wayne State, 1993); Dean S. McGaughey, M.D. (Chicago, 1994); Ramzi Moufarrej, M.D. (Beirut, 1994); Gregory Palega, M.D. (Cornell, 1994); John R. Pawloski, M.D. (St. Louis, 1994); Daniel K. Ries, M.D. (Minnesota, 1994); Paula D. Ryan, M.D. (Rochester, 1994); Michael A. Scherlag, M.D. (Oklahoma, 1994); Tushar N. Shah, M.D. (North Carolina, 1994); Jill K. Sisney, M.D. (Oklahoma, 1994); Felicia Skalski, M.D. (UMDNJ, 1994); Desiree Soter-Pearshall, M.D. (Rush, 1994); Steven H. Tai, M.D. (Louisiana State, 1994); Eric J. Velazquez, M.D. (Albert Einstein, 1994); Christopher W. Woods, M.D. (Duke, 1994).

Medicine/Pediatrics: Tony O. Blue, M.D. (North Carolina, 1993); Anthony Buonanno, M.D. (SUNY-Brooklyn, 1993); David A. Cline, M.D. (Rush, 1993); Larry W. Kelly, M.D. (Duke, 1993); Christopher D. Pilcher, M.D. (Vermont, 1993); Dannah W. Wray, M.D. (Duke, 1993).

Medicine/Psychiatry: Greg L. Clary, M.D. (Texas-Houston, 1992).

Junior Assistant Residents: Scott H. Adler, M.D. (Maryland, 1995); Gregory S. Ahearn, M.D. (Hahnemann, 1995); Nadya A. Ajanee, M.D. (Aga Khan, 1993); Mark D. Aldous, M.D. (Duke, 1995); Saleh Dammas Al-Ghamdi, M.D. (King Abdulaziz, 1989); Victoria A. Arlauskas, M.D. (Jefferson, 1995); Ravisankar R. Avva, M.D. (Duke, 1995); Patrick H. Bowen, M.D. (Duke, 1995); Susan Bryne-O'Shea, M.D. (Univ. Coll. Cork, 1993); Andrea D. Coviello, M.D. (Duke, 1995); Bryan H. Curry, M.D. (Howard, 1995); Mohammed M. Dar, M.D. (Duke, 1995); Lazaro A. Diaz, M.D. (Minnesota, 1995); Mark A. East, M.D.

(North Carolina, 1995); Shona Ferrier-Martin, M.D. (Duke, 1995); Anthony L. Filly, M.D. (Bowman Gray, 1995); Derel Finch, M.D. (Washington, 1995); Michael J. Golioto, M.D. (UMDNJ, 1995); Geoffrey S. Gottlieb, M.D. (Chicago, 1995); Nancy M. Hardy, M.D. (Washington, 1995); Suzanne D. Kovacs, M.D. (New York Med., 1994); Steven M. Lipkin, M.D. (California-San Diego, 1995); Yuan Lu, M.D. (Shanghai, 1987); Scott D. Lunin, M.D. (Duke, 1995); R. Scott McClelland, M.D. (Washington, 1995); V. Raman Muthusamy, M.D. (Washington, 1995); W. Garrett Nichols, M.D. (Duke, 1995); Daniel A. Nikcevich, M.D. (Rush, 1995); Philip J. Norris, M.D. (Columbia, 1995); John C. O'Shea, M.D. (Univ. Coll. Cork, 1989); John L. Petersen, M.D. (Washington, 1995); Thomas J. Povsic, M.D. (Harvard, 1995); Caroline L. Roberts, M.D. (Med. Coll. Ohio, 1995); Michael J. Ross, M.D. (New York Univ., 1995); Brian H. Schactman, M.D. (Med. Coll. Virginia, 1995); Atif Shafqat, M.D. (Aga Khan, 1993); Dylan L. Steer, M.D. (Duke, 1995); Jennifer E. Tseng, M.D. (Duke, 1995); Liza S. Yballe, M.D. (Loyola, 1995).

Medicine/Pediatrics: Deanna K. Branscom, M.D. (Virginia, 1994); Weijen Chang, M.D. (New York Med. Coll., 1994); Shannon L. Hader, M.D. (Columbia, 1995); Keith G. Harkins, M.D. (Georgetown, 1995); Elizabeth A. Hunt, M.D. (Albany, 1995); G. Marshall Lyon, M.D. (Marshall, 1994); Thomas A. Owens, M.D. (SUNY-Buffalo, 1995); Suzanne K. Trzcinski, M.D. (Med. Coll. Ohio, 1994).

Medicine/Neurology: John R. Lynch, M.D. (Duke, 1994); Augusto Parra, M.D. (Escuela Colombia, 1988).

Medicine/Psychiatry: Kristen A. Tyzkowski, M.D. (Med. Coll. Ohio, 1994).

Interns: Anjali S. Advani, M.D. (Duke, 1996); Benjamin Atkeson, M.D. (Georgetown, 1996); Paul Baird, M.D. (Duke, 1996); Jeffrey Behar, M.D. (Tulane, 1996); Suzanne A. Boyer, M.D. (Washington Univ., 1996); Saira Choudhri, M.D. (Aga Khan, 1994); Stephen Y-C Chui, M.D. (Duke, 1996); Steven D. Crowley, M.D. (Duke, 1996); Michael N. DiCuccio, M.D. (Duke, 1996); John J. Engemann, M.D. (Wayne State, 1996); Nurum F. Erdem, M.D. (Michigan, 1996); Ahmed A. Farag, M.D. (Cairo, 1987); V. Rutledge Forney, M.D. (Emory, 1996); Gregory P. Gerschütz, M.D. (Ohio State, 1996); Caroline L. Hebert, M.D. (Ohio State, 1996); Consuelo L. Hopkins, M.D. (Howard, 1996); Gregory D. Huhn, M.D. (Tulane, 1996); Christopher P. Jordan, M.D. (East Carolina, 1995); Maria J. Joyce, M.D. (Boston, 1996); Kevin D. Lanclos, M.D. (Med. Coll. Georgia, 1996); Joi M. Lenczowski, M.D. (Duke, 1996); Kimberly S. Mohs, M.D. (USUHS, 1996); Susan E. Nelson, M.D. (Pittsburgh, 1996); Kristina E. Norvell, M.D. (Duke, 1996); John G. Pazin, M.D. (Duke, 1996); Robert L. Percell, M.D. (Johns Hopkins, 1996); Cathy A. Petti, M.D. (Duke, 1995); Mark A. Pirner, M.D. (Minnesota, 1996); John F. Plankeel, M.D. (Ohio State, 1996); Joseph W. Poku, M.D. (Tufts, 1996); Sunil V. Rao, M.D. (Ohio State, 1996); Abdallah G. Rebeiz, M.D. (American, 1996); Sara E. Roobol, M.D. (Wayne State, 1996); Arman Sabet, M.D. (New Mexico, 1996); William J. Sayre, M.D. (Virginia, 1996); Laura L. Sessums, M.D. (Vanderbilt, 1996); Manish A. Shah, M.D. (Harvard, 1996); Jason E. Stout, M.D. (SUNY-Syracuse, 1996); Mark H. Strong, M.D. (Mississippi, 1996); William T. Sumner, M.D. (Duke, 1996); Mark A. Weinberg, M.D. (Duke, 1996); Alvin F. Wells, M.D. (South Florida, 1996); Sally J. York, M.D. (Washington Univ., 1996).

Medicine/Pediatrics: Eric A. Higginbotham, M.D. (Texas-Houston, 1996); Rajiv K. Jain, M.D. (SUNY-Buffalo, 1996); Venus Pitts, M.D. (Harvard, 1996); Russell Rothman, M.D. (Duke, 1996); Ann Marie Valente, M.D. (Vermont, 1996); Michael Vozzelli, M.D. (Temple, 1996).

Medicine/Psychiatry: Jude R. Alexander, M.D. (Miami, 1996); Eric J. Christopher, M.D. (Med. Coll. Wisconsin, 1996); Sharon B. Meglathery, M.D. (Oregon, 1996); Henry Radziewicz, M.D. (SUNY-Brooklyn, 1996).

Fellows: Darrick J. Alaimo, M.D. (Yale, 1992); Barbara D. Alexander, M.D. (East Carolina, 1993); John H. Alexander, M.D. (Pennsylvania, 1993); Karen L. Alexander, M.D. (Duke, 1992); Sana M. Al-Khatib, M.D. (Beirut, 1993); J. Andrew Alspaugh, M.D. (Duke, 1991); Alan S. Ament, M.D. (Chicago, 1992); Peter B. Amsterdam, M.D. (Harvard, 1990); R. David Anderson, M.D. (John Hopkins, 1990); Krairerk Athirakul, M.D. (Univ. Prince of Songkla, 1986); Helen S. Barold, M.D. (Rochester, 1991); Gregory W. Barnes, M.D. (Minnesota, 1991); Bradley A. Bart, M.D. (Minnesota, 1990); Wayne B. Batchelor, M.D. (Queen's, 1990); Judy K. Battle, M.D. (Louisiana State, 1993); Patrick J. Berger, D.O. (Univ. National Federico, 1986); Mark A. Blakeslee, D.O. (Philadelphia Coll. Osteopathic Med., 1991); S. Maynard Bronstein, M.D. (Duke, 1992); Deborah L. Bursey, M.D. (Arkansas, 1992); Martha S. Carraway, M.D. (Bowman Gray 1988); Kelly L. Carson, M.D. (Emory, 1991); Russ P. Carstens, M.D. (Yale, 1990); Jose Cavazos, M.D. (Instit. Techno, 1987); Joanne M. Ceimo, M.D. (New York Med. Coll., 1975); S. Rinku Chatterjee, M.D. (Tufts, 1993); Vani R. Chilukuri, M.D. (Anahra Med. Coll. 1982); Darrel P. Cohen, M.D. (Boston, 1992); Maureen E. Collins, M.D. (Jefferson, 1991); James J. Crowley, M.D. (Univ. Coll. Galway, 1985); Michael Cuffe, M.D. (Duke, 1991); Christopher Deitch, M.D. (Hahnemann, 1993); Sanjay A. Desai, M.D. (Washington Univ., 1992); Susan J. Diem, M.D. (Tulane, 1989); Christopher Deitch, M.D. (Hahnemann, 1993); Jason A. Dominitz, M.D. (Maryland, 1991); Mohamad Ali Eloubeidi, M.D. (Beirut, 1993); Pang-Chieh "Jerry" Eu, M.D. (Chicago, 1992); James Fanning, M.D. (Ohio State, 1993); Vance G. Fowler, M.D. (North Carolina, 1993); Cristina Gasperetto, M.D. (Rome, 1986); Jennifer B. Green, M.D. (Virginia, 1993); Adam B. Greenbaum, M.D. (New York Univ., 1992); Michael S. Hardee, M.D. (Florida, 1992); James Hochrein, M.D. (Ohio State, 1990); Allen Hsieh, M.D. (Columbia, 1991); Michael P. Hudson, M.D. (Illinois, 1991); Aatif M. Husain, M.D. (Rawalpindi, 1989); Olafur S. Indridason, M.D. (Iceland, 1987); Aamir Javaid, M.D. (Aga Khan, 1991); Nicole Jelesoff, M.D. (Georgetown, 1991); Eileen Johnston, M.D. (Virginia, 1991); Anita M. Kelsey, M.D. (Connecticut, 1991); David F. Kong, M.D. (Johns Hopkins, 1993); Christopher D. Kontos, M.D. (Med. Coll. Virginia, 1989); Ladonna Koziol, M.D. (Illinois, 1992); Aleksander Krunic, M.D. (Belgrade, 1988); Danielle R. Kwakye-Berko, M.D. (SUNY-Syracuse, 1993); Thomas J. Lang, M.D. (Maryland, 1993); Daniel Laskowitz, M.D.

(Duke, 1991); Daniel T. Layish, M.D. (Boston, 1990); Thu H. Le, M.D. (George Washington, 1993); David M. Lee, M.D. (Duke, 1996); Scott L. Letendre, M.D. (Georgetown, 1986); Marc C. Levesque, M.D. (Yale, 1989); Chang S. Lim, M.D. (Duke, 1992); Weei-Chin Lin, M.D. (Nat'l. Taiwan, 1986); Minakshi Madan, M.D. (McGill, 1991); Shabnam Madani, M.D. (Hacettepe Univ, 1991); Harvey E. Marshall, M.D. (Bowman Gray, 1991); David O. Martin, M.D. (Alabama, 1992); Steven T. Mast, M.D. (California-San Francisco, 1993); Timothy J. McMahon, M.D. (Tulane, 1993); Farrell O. Mendelsohn, M.D. (Johns Hopkins, 1992); Frances T. Meredith, M.D. (Virginia, 1991); Klaus Mergener, M.D. (Heidelberg, 1989); Ivan Merckel, M.D. (Univ. National Federico Villarreal, 1986); Frances T. Meredith, M.D. (Virginia, 1991); Julie M. Miller, M.D. (Minnesota, 1992); Michael T. Miller, M.D. (Albany, 1992); Elvia G. Moreta, M.D. (Cath. Univ. Guayaquil, 1988); Edward I. Morris, M.D. (Howard, 1991); Andrew J. Muir, M.D. (Duke, 1993); Jeffrey B. Mundorf, M.D. (Southwestern 1990); Kavita Nanda, M.D. (Albany, 1990); Luis R. Navas, M.D. (Univ. Francisco Marroquin, 1991); Keith H. Newby, M.D. (Eastern Virginia, 1990); Scott M. Palmer, M.D. (Duke, 1993); Kelly S. Parsey, M.D. (Maryland, 1991); Jorge Pascual, M.D. (Rio de Janeiro, 1981); A. Thomas Perkins, M.D. (Northeastern, 1991); Derek A. Persons, M.D. (Duke, 1991); Gail E. Peterson, M.D. (Michigan, 1991); Carol Petrucci, M.D. (SUNY-Brooklyn, 1991); Mark W. Pulsipher, M.D. (Utah, 1988); Robert C. Quackenbush, M.D. (Washington Univ, 1992); Michael Ramirez, M.D. (Temple, 1991); Sharon J. Reilly, M.D. (George Washington, 1991); Clara I. Restrepo, M.D. (Louisiana, 1990); Adrienne L. Richards, M.D. (Johns Hopkins, 1991); David Rizzieri, M.D. (Rochester, 1991); Kellie Rizzieri, M.D. (Rochester, 1991); Derrick Robinson, M.D. (North Carolina, 1992); Richard M. Roman, M.D. (Tufts, 1990); Joshua Rubin, M.D. (Cornell, 1993); Stuart D. Russell, M.D. (Washington, 1991); Renato M. Santos, M.D. (Iowa, 1990); Ernst-Gilbert Schreiber, M.D. (Cologne, 1987); Sebastian Sepulveda, M.D. (Univ. Chile, 1988); Gregg S. Shander, M.D. (Pennsylvania, 1990); Heather S. Shaw, M.D. (Duke, 1993); Michael A. Shetzline, M.D. (Ohio, 1991); David B. Simonds, M.D. (Bowman Gray, 1990); Grant R. Simons, M.D. (Duke, 1990); James C. Strobel, M.D. (Indiana, 1991); Mark W. Swaim, M.D. (Duke, 1990); Elizabeth A. Talbot, M.D. (UMDNJ, 1992); Mark Thel, M.D. (Georgetown, 1986); Gery F. Tomassoni, M.D. (Pennsylvania State, 1990); Chen Y. Tung, M.D. (Ohio State, 1992); Bryan D. Uslick, M.D. (Ohio State, 1991); Andrew Wang, M.D. (Duke, 1990); John J. Warner, M.D. (Vanderbilt, 1992); Marc A. Warmuth, M.D. (Texas-Houston, 1991); Thomas J. Weber, M.D. (Chicago, 1989); William W. Wharton, M.D. (Virginia, 1988); James D. Whitehouse, M.D. (Emory, 1993); Stephen W. Wilczynski, M.D. (Vermont, 1989); Michelle P. Winn, M.D. (East Carolina, 1992).

DIVISION OF DERMATOLOGY

Richard J. Antaya, M.D. (Tufts, 1989); Miriam S. Bettencourt, M.D. (Sao Paulo, 1989); Kimberly A. Bohjanen, M.D. (Michigan, 1993); Christie E. Elkins, M.D. (Texas Health Sci. Center, 1995); Elizabeth M. Faircloth, M.D. (North Carolina, 1995); Maria Mariencheck, M.D. (Washington Univ., 1994); Mary Ann Martinez, M.D. (Texas-San Antonio, 1993); Renee J. Mathur, M.D. (Harvard, 1994); Greg E. Viehman, M.D. (Jefferson, 1993).

DIVISION OF NEUROLOGY

Richard S. Bedlack, M.D. (Connecticut, 1995); Cheryl D. Bushnell, M.D. (Med. Coll. Wisconsin, 1995); Ching-Chaing Chu, M.D. (Kaohsiung, 1987); Emma Cialfoni, M.D. (Milan, 1989); Ilkan Cokgor, M.D. (Hacettepe, 1989); Mustapha A. Ezzeddine, M.D. (Beirut, 1993); A. James Fessler, M.D. (Vanderbilt, 1995); Lynn C. Liu, M.D. (Georgetown, 1994); Gandis G. Mazeika, M.D. (California-Davis, 1993); Michael T. Pulley, M.D. (Maryland, 1993); Igor Stojanov, M.D. (Rijeka, 1987); Mark Wainwright, M.D., Ph.D. (Chicago, 1995); Sibyl E. Wray, M.D. (Bowman Gray, 1994).

Obstetrics and Gynecology

Chief Residents: Kelly Alexander, M.D. (Duke, 1993); Susann Clifford, M.D. (Florida, 1993); Craig Gaccione, M.D. (New York Med. Coll., 1993); Elizabeth Sandridge Haswell, M.D. (Bowman Gray, 1993); Barbara Osborn, M.D. (Duke, 1993); David Schutzer, M.D. (UMDNJ, 1993); George Talbot, M.D. (Cincinnati, 1993).

Senior Assistant Residents: Angeles Alvarez, M.D. (Washington, 1994); Matthew Barber, M.D. (Jefferson, 1994); Robert L. Giuntoli, M.D. (Pennsylvania, 1994); Tara Gustilo, M.D. (Mayo, 1994); Anthony J. Koehler, M.D. (Loma Linda, 1994); Brian Register, M.D. (Duke, 1994); Geoffrey Turner, M.D. (Texas-Houston, 1994).

Assistant Residents: Joseph R. Axlerod, M.D. (Rush, 1995); Anne L. Drapkin, M.D. (Duke, 1995); Laura J. Havrilesky, M.D. (Duke, 1995); Frank Kwakye-Berko, M.D. (New York, 1995); Amy O. Schneider, M.D. (Duke, 1995); Kenneth D. Slack, M.D. (Albert Einstein, 1995); Shelly W. Wroth, M.D. (Columbia, 1995).

Junior Assistant Resident: Linda L. Fetko, M.D. (Duke, 1996); Jennifer A. Kalich, M.D. (Michigan, 1996); Jennifer L. Occhipinti, M.D. (Massachusetts, 1996); Timothy A. Olson, M.D. (Minnesota, 1991); Katharine H. Taber, M.D. (Virginia, 1996); Gerald E. Welch, M.D. (Ohio State, 1995).

Ophthalmology

Chief Resident: Eric Postel, M.D. (Philadelphia, 1991).

Residents: Pranav Amin, M.D. (India, 1986); Dipali Apte, M.D., Ph.D. (Illinois, 1993, 1992); Charles Bock, M.D. (Northwestern, 1993); Koroush Dastgheib, M.D. (Paris, 1989); Anthony deBeus, M.D. (Mount Sinai, 1994), Ph.D. (New York, 1992); Sundeeep Dev, M.D. (Boston, 1993); Judith S. Englert, M.D. (Duke, 1994); Laura Enyedi, M.D. (North Carolina, 1993); Mikyung Kwah, M.D. (New York, 1992); Keith McCormick, M.D. (North Carolina, 1994); Stephen L. Perkins, M.D. (Duke, 1995); Thomas Stone, M.D. (New York, 1995); Nikhil Wagle, M.D. (Wisconsin, 1994).

Pathology

Chief Resident: Thomas A. Sporn, M.D. (Georgetown, 1986).

Residents: Christopher D. Ackley, M.D. (South Alabama, 1995); Henry R. Carag, M.D. (Chicago, 1995); James L. Caruso, M.D. (Illinois, 1988); Byron L. Carpenter, M.D. (Oklahoma, 1993); Chiling Chai, M.D. (Beijing, 1982); Charleen T. Chu, M.D., Ph.D. (Duke, 1994, 1993); Rajesh C. Dash, M.D. (Champaign, 1995); Catherine Fischer, M.D. (North Carolina, 1989); Timothy F. Gladding, M.D. (Indiana, 1992); Daniel J. Kenan, M.D., Ph.D. (Duke, 1995); William E. Mangano, M.D. (North Carolina, 1992); David G. Marcheschi, M.D. (Ohio, 1992); Eoghan E. Mooney, M.B., MRCPI (Dublin, 1988); William F. Moore, M.D. (Tulane, 1992); Emilie Morphew, M.D. (Michigan State, 1992); J. Dean Nuckols, M.D., Ph.D. (Virginia, 1995, 1994); Eri Oshima, M.D. (Albany, 1991); Tim D. Oury, M.D., Ph.D. (Duke, 1994, 1993); Johanna E. Reneke, M.D. (San Francisco, 1993), Ph.D. (Berkeley, 1989); Lisa J. Robinson, M.D. (Cornell, 1991); Elizabeth A. Saria, M.D. (Colorado, 1979); Tomas Slavik, MB., Ch.B. (Pretoria, 1989); Timothy T. Stenzel, M.D., Ph.D. (Duke, 1992, 1991); Robert C. Stern, M.D. (Texas-Galveston, 1981); Sharon A. Szukala, M.D. (Buffalo, 1994); John F. Toso, M.D. (Pittsburgh, 1992).

Fellows: Mark R. Matthews, M.D. (Med. Coll. Georgia, 1992); Michael L. Wallace, M.D. (George Washington, 1991).

Pediatrics

Chief Resident: Jeffrey Moreadith, M.D. (Duke, 1992).

Third Year Residents: Marc Bahan, M.D. (South Carolina, 1994); Laura Brooks, M.D. (Virginia, 1994); Michael Deitchman, M.D. (Texas-Galveston, 1994); Kathleen Gallagher, M.D. (Bowman Gray, 1994); Michelle Halby, M.D. (East Carolina, 1994); Nadia Ibrahim, M.D. (Georgetown, 1994); Alicia Johnston, M.D. (SUNY-Syracuse, 1994); William McCann, M.D. (Georgetown, 1994); Michele McCormick, M.D. (South Carolina, 1994); Steven Mumbauer, M.D. (Temple, 1994); Rebecca Passon (Pennsylvania State, 1994); Jeffrey Ryan, M.D. (Ohio, 1994); Henry Sakai, M.D. (Virginia, 1994).

Second Year Residents: Michelle Bailey, M.D. (SUNY-Buffalo, 1995); Noreen Baluyot, M.D. (Texas-Houston, 1995); Tracy Bleything, M.D. (Kansas, 1995); Maureen Burke, M.D. (SUNY-Brooklyn, 1995); Katherine Meadows Harper, M.D., M.P.H. (North Carolina, 1995); Anita Maniktala, M.D. (Dartmouth, 1995); David Masters, M.D. (East Carolina, 1995); Mary Nevin, M.D. (Northwestern, 1995); Susan P. Owens, M.D. (SUNY-Buffalo, 1995); T. Snehal Patel, M.D. (New Jersey, 1995); Bryan L. Phillips, M.D. (Wright State, 1995); Debra M. Schmidt, M.D. (Pittsburgh, 1995); Valerie Spreng, M.D. (Albany, 1995); Nicole Washington, M.D. (Howard, 1995).

First Year Residents: Natalie Aloia, M.D. (California-Los Angeles, 1996); Correne Boucher, M.D. (Johns Hopkins, 1996); Anne Bradshaw, M.D. (Virginia, 1996); Michael Camitta, M.D. (Texas-San Antonio, 1996); Amy Davidson, M.D. (Emory, 1996); Christopher Gianvecchio, M.D. (Illinois, 1996); John Keith, M.D. (Howard, 1996); David Mertz, M.D. (Hawaii, 1996); Angelo Milazzo, M.D. (SUNY-Stonybrook, 1996); Oliver Muensterer, M.D. (Munich, 1994); Annmarie Panarotto, M.D. (UMDNJ, 1996); Kelly Ross, M.D. (Missouri, 1996); Ronald Spiegel, M.D. (Jefferson, 1996).

Fellows: Paul Adholla, M.D. (Nairobi, 1987); Ayesha Ahmad, M.D. (Aga Khan, 1991); Robert Bart, M.D. (John Burns, 1990); Carol Ann Blanchong, M.D. (Northeastern Ohio, 1993); Susan Boutilier, M.D. (California-Davis, 1993); Genevieve Cachueta, M.D. (Saint Thomas, 1991); Michael Cannon, M.D. (East Carolina, 1992); Michael Carboni, M.D. (Northeastern, 1990); Sharon Castellino, M.D. (Duke, 1992); Pantipa Chatchatte, M.D. (Thailand, 1987); Kenji Cunnion, M.D., M.P.H. (Duke, 1993); Michael Daines, M.D. (St. Louis, 1993); Timothy Driscoll, M.D. (Ohio State, 1990); Craig Fleishman, M.D. (Yale, 1989); Peter Gaskin, M.D. (West Indies, 1988); Barbara Hipp, M.D. (Vanderbilt, 1993); Richard Howrey, M.D. (Michigan, 1991); Shao-Hsuan Hsia, M.D. (Taiwan, 1989); Chris Hubble, M.D. (South Florida, 1993); Jennifer Jaroscak, M.D. (Ohio State, 1993); Troy Johnston, M.D. (Virginia, 1991); Jennifer Knight, M.B. (West India, 1988); Lufuno Mathivha, M.D. (Natal, South Africa, 1982); Geoffrey McCowage, M.D., B.S. (Sydney, 1985); James McGovern, M.D. (Ohio State, 1990); Laurie Myers, M.D. (Ohio State, 1992); Rita Ongjoco, D.O. (New York Coll. Osteopath. Med., 1990); John Papagiannis, M.D. (Aristotelian Univ., Thessalonian, Greece, 1983); Anna Petryk, M.D. (Dundee, Scotland, 1991); James Powell, M.D. (Pennsylvania State, 1992); Jerald Purifoy, M.D. (Michigan, 1987); David Riester, M.D. (San Antonio, 1992); Lisa Robinson, M.D. (Toronto, 1991); James Rost, M.D. (Brown, 1991); Mimi Tang, M.D. (Melbourne, 1986); Mark Wainwright, M.D. (Chicago, 1995); Martin White, M.D. (Laois Med. Sch., Dublin, Ireland, 1985); Michael Womack, M.D. (Texas-Southwestern, 1991); Sherri Zimmerman, M.D. (North Carolina, 1991).

Psychiatry

Chief Residents: Pawel Dudek, M.D. (Copernicus Med. Sch., Poland, 1988); Michael Hughes, M.D. (Bowman Gray, 1993); Danuta Jagla-Schudel, M.D. (Mikolaj Kopernik Acad., Poland, 1988); Charles Vance, M.D., Ph.D. (Duke, 1993); Jill Williams, M.D. (UMDNJ, 1993).

Fourth Year Residents: Ayesha Chaudhary, M.D. (Aga Khan Univ., Pakistan, 1991); Kathryn Connor, M.D. (Maryland, 1993); Pawel Dudek, M.D. (Copernicus Med. Sch., Poland, 1988); Ken Gersing, M.D. (Washington, 1993); Justine Greathouse-Jerrett, M.D. (Ohio, 1993); Michael Hughes, M.D. (Bowman Gray, 1993); Danuta Jagla-Schudel, M.D. (Mikolaj Kopernik Acad., Poland, 1988); Robert Schneider, M.D. (Emory, 1985); Charles Vance, M.D., Ph.D. (Duke, 1993); Jill Williams, M.D. (UMDNJ, 1993).

Third Year Residents: Nives Antolovic-Stanfel, M.D. (Zagreb Med. Faculty, 1983); Charles Beltz, M.D. (North Carolina, 1994); Suvrat Bhargava, M.D. (Georgia, 1994); Sharon Curtis, M.D. (Missouri-Columbia, 1994); Hector DeLeon-Miranda, M.D. (Univ. Central De Caribe, Puerto Rico, 1994); Beverley Grimm, M.D. (Miami, 1994); Amy Jones, M.D. (South Carolina, 1994); Erik Lindfors, M.D. (Texas, 1994); Christine Marx, M.D. (Duke, 1994); Ramin Parsey, M.D., Ph.D. (Maryland, 1994); Kristen Tsyzkowski, M.D. (Temple, 1994).

Second Year Residents: Trina Allen, M.D. (SUNY-Buffalo, 1995); Moira Artigues, M.D. (South Carolina, 1995); Shannon Barnett, M.D. (Colorado, 1995); Christine Chruscucki, M.D. (SUNY-Buffalo, 1995); Charles Conway, M.D. (Missouri-Columbia, 1995); Margaret Dean, M.D. (Brown, 1995); Cassandra Harewood, M.D. (Oklahoma, 1995); C. Lawrence Horn, M.D. (Georgetown, 1991); Eric Kirchmann, M.D. (Washington Univ., 1995); Patricia Knaudt, M.D. (Oklahoma, 1995); Kim Knittel, M.D. (Rochester, 1995); Michelle Kramer, M.D. (Tufts, 1995); Alpa Patel, M.D. (Rush, 1995); Javier Prado, M.D. (Rochester, 1995); Neil Scheurich, M.D. (Michigan, 1995).

First Year Residents: Jude Alexander, M.D. (Miami, 1996); Samina Aziz, M.D. (Aga Khan, 1994); Dewayne Book, M.D. (Mercer, 1996); Eric Christopher, M.D. (Med. Coll. Wisconsin, 1996); Jennifer Kern, M.D. (Ohio, 1996); Gregory Lunceford, M.D. (Chicago, 1996); Ajay Makhija, M.D. (South Alabama, 1996); Tom McCormack, M.D. (Emory, 1996); Sharon Meglathery, M.D. (Oregon, 1996); Samantha Meltzer-Brody, M.D. (Northwestern, 1996); Hank Radziewicz, M.D. (SUNY-Brooklyn, 1996); Ewa Sikora, M.D. (Pomorska Acad. Med., 1992); Warren Taylor, M.D. (South Florida, 1996); Laura Tuttle, M.D. (New Mexico, 1996).

Child Psychiatry Chief Residents: Christopher Kratochvil, M.D. (Creighton, 1992); Myra McSwain, M.D. (Georgia, 1992).

Child Psychiatry Residents: Helen Egger, M.D. (Yale, 1991); Paul Grant, M.D. (Bowman Gray, 1973); John Heintzman, M.D. (Queens Univ., Canada, 1993); Christopher Kratochvil, M.D. (Creighton, 1992); Mark Mattioli, M.D. (Univ. Degli Studi, Rome, 1985); Myra McSwain, M.D. (Georgia, 1992); Bruce Riggins, M.D. (Georgia, 1992); Kendall Warden, M.D. (Missouri, 1991).

Substance Abuse Fellow: Tedra Anderson-Brown, M.D. (Duke, 1991).

Radiation Oncology

Residents: Kasra Badiozamani, M.D. (Washington, 1995); Joseph Bean, M.D. (Washington, 1993); Dennis Carter, M.D. (Washington, 1993); Wade Gebara, M.D. (Georgia, 1993); Timothy Jamieson, M.D., Ph.D. (Virginia, 1994, 1993); Patrick Maguire, M.D. (Penn State, 1995); Philip Villiotte, M.D. (Dartmouth, 1995).

Radiology

Residents: Michael Arata, M.D. (San Francisco, 1994); Jay A. Baker, M.D. (Duke, 1992); Scott Boles, M.D. (Southern California, 1993); Michael Borbely, M.D. (Georgetown, 1992); Joanna Branick, M.D. (Pennsylvania, 1992); Brian Brodwater, M.D. (Dartmouth, 1993); Sunny Chung, M.D. (Northeastern Ohio, 1992); Roger Lee Cothran, Jr., M.D. (Duke, 1995); Curtis Coulam, M.D. (Utah, 1994); Robert Cranley, M.D. (Boston, 1995); Mary Curtis, M.D. (Nebraska, 1991); Stephen A. Fine, M.D. (Massachusetts, 1995); Sujata V. Ghatge, M.D. (North Carolina, 1994); Howard Goldberg, M.D. (Maryland, 1992); Rosalie Hagge, M.D. (Washington Univ., 1988); William Lee Hall, M.D. (Duke 1995); Daniel J. Hatch, M.D. (Utah, 1994); Allyson A. Haymes, M.D. (Harvard, 1994); Laura Heyneman, M.D. (North Carolina, 1992); Marseea Howard, M.D. (Alabama, 1994); Lyndon Jordan, M.D. (Duke, 1993); Jim Killius, M.D. (SUNY-Buffalo, 1994); Frank Kosarek, M.D. (Columbia, 1990); Lynn Lecas, M.D. (Miami, 1995); Lisa J. Lee, M.D. (Medical College of Ohio, 1995); Vivian Lee, M.D., Ph.D. (Harvard, 1992); Steven Malchow, M.D. (Duke, 1994); Edward Math, M.D. (SUNY, 1993); Michael J. Miller, M.D. (Hahnemann, 1994); Ryan Nielsen, M.D. (Creighton, 1995); Brian Polesuk, M.D. (UMDNJ, 1993); Louis Posillico, M.D. (Georgetown, 1991); Thomas Presson, Jr., M.D. (Bowman Gray, 1995); Scott Price, M.D. (Maryland, 1992); Michelle Rivera, M.D. (Harvard, 1992); Andrew Schneider, M.D. (Duke, 1994); Brandt Schraner, M.D. (George Washington, 1995); Douglas Shusterman, M.D. (Georgetown, 1993); Jeffrey Silber, M.D. (Baylor, 1992); Kathleen Sitarik, M.D. (Hahnemann, 1993); Brooke Spencer, M.D. (Vermont, 1995); Wade Thorstad, M.D. (Texas-Houston, 1991); Joseph E. Wagner, M.D. (North Carolina, 1995); Sybille Woel, M.D. (Pittsburgh, 1995); Michael J. Workman, M.D. (Iowa, 1994); Stephanie Yen, M.D. (Duke, 1992).

Surgery

DIVISIONS OF GENERAL AND CARDIOTHORACIC SURGERY

Instructors and Teaching Scholars: James R. Mault, M.D. (Michigan, 1988); Cary H. Meyers, M.D. (Chicago, 1988); David S. Peterseim, M.D. (Washington Univ. 1988); Mark Tedder, M.D. (Duke, 1988).

Instructors and Chief Residents: Hartmuth B. Bittner, M.D. (Heidelberg, 1989); Bradley H. Collins, M.D. (Duke, 1989); Mark G. Davies, M.D. (Dublin, 1986); Joseph M. Forbess, M.D. (Harvard, 1990); Carmelo A. Milano, M.D. (Chicago, 1990); Scott K. Pruitt, M.D. (Columbia, 1987); Lynne A. Skaryak, M.D. (Duke, 1989).

Cardiothoracic Fellows: Mark P. Anstadt, M.D. (Wright State, 1986); J. Michael DiMaio, M.D. (Miami, 1987); Steven C. Hendrickson, M.D.; Clarence H. Owen, M.D. (Duke, 1989).

Research Fellows: Shahab A. Akhter, M.D. (Chicago-Pritzker, 1993); William R. Burfeind, M.D. (Columbia, 1994); Paul J. Chai, M.D. (Duke, 1994); Larkin J. Daniels, M.D. (Alabama, 1992); Pierre DeMatos, M.D. (Johns Hopkins, 1994); Thomas Z. Hayward, M.D. (Northwestern, 1994); Charles W. Hoopes, M.D. (Duke, 1992); Alan P. Kypson, M.D. (Columbia, 1993); Jeffrey H. Lawson, M.D. (Vermont, 1992); Cleveland W. Lewis, Jr., M.D. (Duke, 1993); Shu S. Lin, M.D. (Duke, 1992); Andrew J. Lodge, M.D. (Duke 1993); Kendra P. Magee, M.D. (Washington Univ. 1993); Marga Massey, M.D. (Duke, 1993); John P. Maurice, M.D. (California, San Francisco, 1994); Robert B. Noone, Jr., M.D. (Pennsylvania, 1993).

Senior Assistant Residents: Lisa A. Clark, M.D. (Harvard, 1994); Bryan M. Clary, M.D. (San Francisco, 1991); Adrian H. Cotterell, M.D. (Duke, 1991); Louis R. DiBernardo, M.D. (Duke, 1991); Paul M. Kirshbom, M.D. (Johns Hopkins, 1991); R. Eric Lilly, M.D. (Duke, 1992); Christopher R. Mantyh, M.D. (Wisconsin, 1991); R. Antonio Perez-Tamayo, M.D. (Chicago, 1990); Scott C. Silvestry, M.D. (Pennsylvania, 1991); James E. St. Louis, M.D. (Georgetown, 1992); Christopher Suhr, M.D. (Duke, 1991); Bryan Weidner, M.D. (Pennsylvania, 1992).

Junior Assistant Residents: B. Zane Atkins, M.D. (Duke, 1995); Dieter Bruno, M.D. (Duke, 1995); Hussein Elkousy, M.D. (Duke, 1995); S. Anthony Harper, M.D. (North Carolina, 1995); Gerald D. Henry, M.D. (North Carolina, 1995); G. Chad Hughes, M.D. (Duke, 1995); Ramsay L. Kuo, M.D. (Boston, 1995); Daniel C. Lai, M.D. (Baylor, 1995); Christine L. Lau, M.D. (Dartmouth, 1995); Mark J. Makhuli, M.D. (New York, 1995); Paul J. Mosca, M.D. (Virginia, 1995); Aurora D. Pryor, M.D. (Duke, 1995); Ashish S. Shah, M.D. (Pittsburgh, 1995); Christopher T. Wenzel, M.D. (Duke, 1995).

First Year Residents: Thomas A. Aloia, M.D. (UCLA, 1996); Shankha S. Biswas, M.D. (Duke, 1996); Ketan R. Bulsara, M.D. (Duke, 1996); Robert Byrne, M.D. (Baylor, 1996); Philip Dahme, M.D. (Germany, 1996); Michael J. Davidson, M.D. (Yale, 1996); Brett E. Dorfman, M.D. (Emory, 1996); Michelle A. Ghert, M.D. (Vanderbilt, 1996); Samantha K. Hendren, M.D. (Yale, 1996); M. Todd Jacobs, M.D. (Duke, 1996); Timothy J. Kinkead, M.D. (Yale, 1996); Daniel T. Kuesis, M.D. (Northwestern, 1996); Peter J. Linek, M.D. (Virginia, 1996); Russell R. Margraf, M.D. (Albany, 1996); Ravi Munver, M.D. (Cornell, 1996); Marco Rizzo, M.D. (Temple, 1996); G. Robert Stephenson, M.D. (Johns Hopkins, 1996); Chris B. Threath, M.D. (California-Irvine, 1996); David C. White, M.D. (Virginia, 1996); Mark M. Yeh, M.D. (Duke, 1996).

DIVISION OF NEUROSURGERY

Chief Residents: John C. Stevenson, M.D., (Glasgow, 1988); Kasia Van Pett, M.D. (Stanford, 1991).

Residents: Ketan R. Bulsara, M.D. (Duke, 1996); Eric M. Gabriel, M.D. (UMDNJ, 1992); Amy B. Heimberger, M.D. (Tulane, 1995); George F. Jackson, M.D. (Drew, 1995); Philip Henkin, M.D. (Ohio State, 1991); John W. Kim, M.D. (Iowa, 1995); Joseph L. Koen, M.D. (Ohio State, 1993); Sohaib A. Kureshi, M.D. (Southern California, 1994); Russell R. Margraf, M.D. (Albany, 1996); John H. Sampson, M.D. (Manitoba, 1990); Alan T. Villavicencio, M.D. (Harvard, 1995); John C. Wellons, III, M.D. (Mississippi, 1995).

DIVISION OF ORTHOPAEDIC SURGERY

Chief Residents: Jeff D. Almand, M.D. (Tulane, 1991); Frank V. Aluisio, M.D. (Emory, 1991); David L. Cannon, M.D. (Cornell, 1991); Charles L. Herring, Jr., M.D. (Hahnemann, 1991); Eric D. Hoffman, M.D. (Duke, 1991); James C. Karegeannes, M.D. (Duke, 1989); Scott D. Mair, M.D. (Duke, 1991); T. Paul McDermott, Jr., M.D. (Duke, 1991); Gregory S. Motley, M.D. (Kentucky, 1991).

Assistant Residents: Michael L. Beckish, M.D. (Minnesota, 1992); Michael E. Berend, M.D. (Duke, 1992); Shawn C. Bonsell, M.D. (Oregon, 1993); Christian P. Christensen, M.D. (Vanderbilt, 1992); Philip E. Clifford, M.D. (Florida, 1993); Robert E. Coles, M.D. (Duke, 1993); John J. Crawford, M.D. (Vanderbilt, 1993); Brian M. Crites, M.D. (Indiana, 1992); Mark A. Curzan, M.D. (California-Los Angeles, 1994); Aileen M. Danko, M.D. (Temple, 1994); James J. Davidson, M.D. (Duke, 1992); G. Scott Dean, M.D. (Duke, 1993); E. Scott Frankel, M.D. (Rochester, 1994); Christopher K. Jones, M.D. (Emory, 1994); Spero G. Karas, M.D. (Indiana, 1993); Anson S. Li, M.D. (Duke, 1993); Edward G. Lilly, III, M.D. (Duke, 1993); Martin J. Luber, M.D. (Syracuse, 1994); Jeffrey A. Murray, M.D. (Virginia, 1992); Thomas J. Noonan, M.D. (Duke, 1992); James A. O'Leary, M.D. (Vanderbilt, 1993); Jonathan R. Perryman, M.D. (Georgetown, 1994); S. David Stanley, M.D. (Duke, 1993); Alison P. Toth, M.D. (Duke, 1994); Kurt L. Unverferth, M.D. (Ohio State, 1994); C. Robert Wheelless, M.D. (North Carolina, 1992).

DIVISION OF OTOLARYNGOLOGY

Instructors and Chief Residents: Eric L. Cole, M.D. (Duke, 1992); R. William Farmer, M.D. (Duke, 1989); Brian P. Perry, M.D. (Nebraska, 1992).

Assistant Residents: S. Andrew Harper, M.D. (North Carolina, 1995); Patti Huang, M.D. (Duke, 1994); Daniel Lai, M.D. (Baylor, 1995); Sumeet Mathur, M.D. (Harvard, 1994); Amir Moradi, M.D. (California-San Diego, 1994); Gregory J. Mulcahy, M.D. (Queensland, 1991); Eric T. Scarbrough, M.D. (Georgetown, 1993); Christopher T. Wenzel, M.D. (Duke, 1995).

DIVISION OF PLASTIC, RECONSTRUCTIVE, MAXILLOFACIAL AND ORAL SURGERY

Instructors and Chief Residents: Philip G. Coogan, M.D. (Vanderbilt, 1988); Frank J. Ferraro, M.D. (UMDNJ, 1988); Therese-Anne LeVan, M.D. (Rush, 1989).

Assistant Residents: C. Brett Carlin, M.D. (Med. Univ. South Carolina, 1991); Tze Yung Ip, M.D. (Texas-Galveston, 1991); Kim E. Koger, M.D. (Duke, 1990); Ben H. Lee, M.D. (Colorado, 1990); Aaron J. Mayberry, M.D. (Michigan, 1990); Patrick J. Viscardi, M.D. (Rochester, 1989).

DIVISION OF UROLOGY

Instructors and Chief Residents: Victor Abraham, M.D. (Temple, 1988); Joseph Neighbors, M.D. (Med. Coll. Virginia, 1990); Neal J. Prendergast, M.D. (Case Western Reserve, 1991); David T. Price, M.D. (Louisiana, 1989).

Assistant Residents: Roberto Ferraro, M.D. (Rush, 1993); Kevin Fitzgerald, M.D. (Baylor, 1993); Stanley Hall, M.D. (Virginia, 1993); John Lacey, M.D. (Wisconsin, 1989); Brian Murphy, M.D. (Duke, 1992); Jeffrey Taber (Duke, 1992); Johannes Vieweg, M.D. (Tech. Univ. Munich, 1988); Patrick Walsh, M.D. (East Carolina, 1993).

Research Residents: James Eaton, M.D. (Duke, 1994); Brian Malloy, M.D. (Southern California, 1994); Philip Newhall, M.D. (Boston, 1994); Frank Roland, M.D. (Duke, 1994).

CLASS ROSTER*

Class of 1997

Ard, Jamy D. (Morehouse), Grambling, Louisiana
Arles, Stephen P. (Lafayette), Durham, North Carolina
Bailey, Steven R. (Yale), Dayton, Ohio
Barth, Rolf N. (Duke), Durham, North Carolina
Beamer, Jennifer Meyer (Duke), Pine Island, Minnesota
Becker, Sylvia I. (Cornell), Syosset, New York
Berend, Keith R. (Florida Southern), Durham, North Carolina
Bliss, Sandra J. (Stanford), River Forest, Illinois
Bloom, Matthew B. (Massachusetts Institute of Technology), Chappaqua, New York
Boley, Elena (Amherst), Washington, District of Columbia
Boyd, Cynthia M. (Yale), Rumson, New Jersey
Bronstein, David M. (Manitoba), Chapel Hill, North Carolina
Callanan, Lawrence D., Jr. (Williams), Williamstown, Massachusetts
Chatterjee, Raneer (Vanderbilt), Knoxville, Tennessee
Coggins, Claire A. (Pennsylvania State), West Chester, Pennsylvania
Collard, Harold R., Jr. (Harvard), Mountain View, California
Colvin, Larry G. (North Carolina at Chapel Hill), Durham, North Carolina
Cook, Marcus P. (Davidson), Charlotte, North Carolina
Criscione, Lisa G. (Duke), Durham, North Carolina
Davis, Carla McGuire (Howard), Ithaca, New York
Diers, Tiffany L. (Duke), Durham, North Carolina
Duncan, James E. (Duke), Newport News, Virginia
Dunn, Toby J. (Texas at Austin), Frisco, Texas
Dyer, Sara L. (George Washington), Torrance, California
Fernando, Nishan H. (Duke), Stone Mountain, Georgia
Fields, Timothy A. (Chicago), Crowley, Louisiana
Finch, Michael R. (Stanford), Moreland Hills, Ohio
Fisher, Galen H. (Colby), Princeton, New Jersey
Gamard, Christopher J. (Duke), New Orleans, Louisiana
Garg, Seema (Duke), Durham, North Carolina
Gerke, Calvin G., Jr. (Texas at Austin), Durham, North Carolina
Gesty-Palmer, Diane (Oberlin), Durham, North Carolina
Gills, James P., III (Vanderbilt), Palm Harbour, Florida
Graham, Robert D., II (Massachusetts Institute of Technology), Maryville, Tennessee
Greene, Jeffrey (Grinnell), Durham, North Carolina
Grubbs, Vanessa (Duke), Spring Lake, North Carolina
Ha, Tuan X. (Yale), Brookline, Massachusetts
Harris, Jason B. (Wesleyan), North Hampton, Massachusetts
Hawkins, Richard D. (North Carolina at Chapel Hill), Belhaven, North Carolina
Henderson, Phillippa J. (Duke), Durham, North Carolina
Hopson, Laura Roff (Yale), Cincinnati, Ohio
Horton, Claire K. (Duke), Durham, North Carolina
Huang, David Y. (Duke), Carrboro, North Carolina
Huffman, George R. (Davidson), Orlando, Florida
Hurwitz, Lynn M. (Haverford), Durham, North Carolina
Jackson, Doniel L. (Duke), St. Charles, Illinois
Jacobs, Jason M. (Harvard), Baldwin, New York
Joneschild, Elizabeth S. (Stanford), Mercer Island, Washington
Kaminetzky, Catherine Pascoe (Stanford), Durham, North Carolina
Kazaks, Emily L. (Duke), Bradenton, Florida
Kraus, John E., Jr. (Florida), Cherry Hill, New Jersey
Kwak, Eunice L. (Stanford), Winston-Salem, North Carolina
Lamvu, Georgine M. (Duke), Durham, North Carolina
Lane, William H. (Harvard), Champaign, Illinois
LaRocque, Regina C. (Emory), Merritt Island, Florida
Locklear, Robert W., Sr. (Duke), Durham, North Carolina
Mallory, Mark A. (Amherst), Littleton, Colorado
Mathy, Christian B. (Stanford), Sugar Land, Texas

*Hometown does not denote legal residence.

Mauskopf, Alice E. (Cornell), Durham, North Carolina
 McCarty, David E. (Virginia), Koloa, Hawaii
 McDonough, Kelly J. (Syracuse), Woodstock, New York
 McFadden, Dwight J. (Goshen), Durham, North Carolina
 McMann, Amy E. (Duke), Chevy Chase, Maryland
 Michelson, Kelly N. (Columbia), St. Louis, Missouri
 Miles, Joseph S. (Duke), Maplewood, New Jersey
 Montgomery, Sean P. (Johns Hopkins), White Hall, Maryland
 Murata, Yoshihiko (Stanford), Durham, North Carolina
 Musgrave, Douglas S. (Oregon), Grand Junction, Colorado
 Nash, S. Russell (Wake Forest), Belton, South Carolina
 Nelson, Caleb P. (Dartmouth), Falmouth, Maine
 Nelson, Robert E. (Princeton), Rochester, New York
 Neyman, Eduard G. (Miami), West Palm Beach, Florida
 Norris, Shannon D. (Duke), Taylors, South Carolina
 Onaitis, Mark W. (Harvard), Pittsburgh, Pennsylvania
 Owen, Sylvia A. (Ambassador), Coos Bay, Oregon
 Pradhan, Archana A. (Princeton), Durham, North Carolina
 Purow, David B. (Brown), Staten Island, New York
 Rao, Bhagwan Jay (Johns Hopkins), Dunn, North Carolina
 Rao, Dinesh S. (Pennsylvania), Murphy, North Carolina
 Rose, John G., Jr. (Dartmouth), Rumson, New Jersey
 Saito, Stacey Y. (Texas at Austin), Chapel Hill, North Carolina
 Schreiber, Jonathan L. (Stanford), Dix Hills, New York
 Sebastian, Brian M. (Duke), North Wilkesboro, North Carolina
 Seo, David M. (Duke), Greensboro, North Carolina
 Shapiro, Leonid (Cornell), Rochester, New York
 Solga, Steven F. (Cornell), Orwigsburg, Pennsylvania
 Spratt, Sarah S. (Oberlin), Washington, District of Columbia
 Srinivasan, Meera (Case Western Reserve), Winter Springs, Florida
 Stekler, Joanne D. (Williams), Bethesda, Maryland
 Stubbs, Allston J., IV (North Carolina at Chapel Hill), Winston-Salem, North Carolina
 Sullivan, Daniel P. (Stanford), Sparta, New Jersey
 Sundin, Burton M. (Duke), Virginia Beach, Virginia
 Sung, Jenny C. (Cornell), Mountainside, New Jersey
 Tong, David C. (Duke), Albany, Georgia
 Trammel, Demaree L. (American), Rochester, New York
 Tull, Frank, IV (Dartmouth), Muskogee, Oklahoma
 Wahl, Tanya (Washington), Lynnwood, Washington
 Watrous, Susan M. (Vassar), Vestal, New York
 Wee, Jonny O. (Harvard), Las Vegas, Nevada
 Weeks, Howard R., III (North Carolina State), Charlotte, North Carolina
 White, Rebekah Ruth (Stanford), Charlotte, North Carolina
 White, Wendy M. (Case Western Reserve), Durham, North Carolina
 Witt, Virginia M. (Phoenix), Efland, North Carolina
 Wong, Christine (Yale), Bethesda, Maryland
 Wu, Ning Z. (Peking-China), Chapel Hill, North Carolina
 Xanthakos, Stavra A. (Duke), Maumee, Ohio
 Yen, Michael H. (Harvard), Hanover, New Hampshire
 Young, Lisa Rosenthal (Virginia), Norfolk, Virginia
 Youngblood, Scot A. (Duke), Durham, North Carolina
 Yu, Paul B. (Stanford), Williamsville, New York

Class of 1998

Adlakha, Charu L. (Massachusetts Institute of Technology), Columbia, Maryland
 Ahuja, Vinita (Duke), Raleigh, North Carolina
 Allen, Jayne D. (Indiana at Bloomington), Salem, Indiana
 Anderson, Scott R. (Duke), Reston, Virginia
 Asplin, Iain R. (Virginia), Charlottesville, Virginia
 Baek, Peter S. (Johns Hopkins), James Island, South Carolina
 Bartholomew, Marnie B. (Bucknell), Shillington, Pennsylvania
 Batten, Dean (North Carolina at Chapel Hill), Smithfield, North Carolina

Berry, Garland K. (David Lipscomb), Lebanon, Tennessee
 Beutler, Anthony L. (Brigham Young), Orem, Utah
 Bienstock, Alan M. (Duke), East Windsor, New Jersey
 Binder, Devin K. (Harvard), Berkeley, California
 Black, Stephanie M. (Johns Hopkins), Olympia, Washington
 Blatt, Ellen R. (Duke), Durham, North Carolina
 Bolden, Jason E. (Minnesota-Morris), Charlotte, North Carolina
 Bolognesi, Michael (North Carolina at Chapel Hill), Durham, North Carolina
 Bowman, Brian P. (Tampa), Durham, North Carolina
 Brady, Todd C. (Dartmouth), Winston-Salem, North Carolina
 Brown, Franchesca D. (Duke), Myrtle Beach, South Carolina
 Bryce, Thomas J. (Amherst), Belle Harbor, New York
 Byerley, Julie S. (Rhodes), Durham, North Carolina
 Camacho, Daniel Louis (Stanford), Gretna, Louisiana
 Chandler, Damon B. (Duke), New Hyde Park, New York
 Cooper, Leslie W. (Georgia State), Chapel Hill, North Carolina
 Corcoran, Ethan E. (Cornell), Pennington, New Jersey
 Courtney, Kevin D. (Dartmouth), Keene, New Hampshire
 Datto, Michael Bradley (Johns Hopkins), Cherry Hill, New Jersey
 Della Rocca, Gregory J. (Cornell), Castleton, New York
 Dike, Nwamara C. (Maryland-College Park), Hyattsville, Maryland
 Dixon, Terry C. (South Carolina at Columbia), Aynor, South Carolina
 Drayer, Jeffrey, (Cornell), East Brunswick, New Jersey
 Durgin, Kristi Warren (North Carolina State), Garner, North Carolina
 Farooki, Aamer Z. (Harvard), Demarest, New Jersey
 Fields, Michael J. (Pennsylvania), Silver Spring, Maryland
 Gagliardi, Jane P. (Brown), Athol, Massachusetts
 Gilliam, Lisa K. (Amherst), Durham, North Carolina
 Gratz, Brett I. (Duke), Durham, North Carolina
 Gullotto, Carmelo (Miami), Homestead, Florida
 Halvorson, Eric G. (Bates), Maplewood, New Jersey
 Hanft, Valerie N. (Duke), Chapel Hill, North Carolina
 Hanley, Matthew L. (Holy Cross), Chapel Hill, North Carolina
 Higgins, Peter Doyle (Duke), Durham, North Carolina
 Holmes, Jude, Jr. (North Carolina at Chapel Hill), Maple Hill, North Carolina
 Hsia, Amie W. (Harvard), Potomac, Maryland
 Hu, Gang (Davidson), Durham, North Carolina
 Huang, Erich S. (Harvard), Durham, North Carolina
 James, Martha L. (Swarthmore), Hillsborough, North Carolina
 Kahl, Christina R. (Dartmouth), Winston-Salem, North Carolina
 Kalady, Matthew F. (Harvard), Allentown, Pennsylvania
 Kihlstrom, Laura J. (North Carolina at Chapel Hill), Chapel Hill, North Carolina
 Killian, Jonathan K. (Stanford), Saratoga, California
 King, Aliceson Y. (Maryland Baltimore County), Baltimore, Maryland
 King, Wendalyn K. (Alabama), Peachtree City, Georgia
 Knize, Leisha M. (Claremont McKenna), Englewood, Colorado
 Kong, James A. (Duke), Dayton, Ohio
 Lager, Patrick J. (Whitman), Shelby, Montana
 Lahey, Timothy P. (Georgetown), Salt Lake City, Utah
 Lee, Kenneth J. (Duke), Charlotte, North Carolina
 Lee, Linda Haekum (Smith), Glendale, Wisconsin
 Levinson, Bari E. (California-Davis), Rancho Murieta, California
 Lien, Lillian F. (Harvard), Germantown, Maryland
 Littman, Eva D. (Duke), New Bern, North Carolina
 Lovdal, Jamie A. (New Hampshire), Raleigh, North Carolina
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 McClure, Matthew W. (California-San Diego), Las Vegas, Nevada
 McMurry, Michelle Taylor (Harvard), Oakland, California
 Meine, Elizabeth Kahn (Yale), Shrewsbury, New Jersey
 Meine, Trip J. (Yale), Columbus, Georgia
 Mitchell, Duane A. (Rutgers), Somerset, New Jersey
 Morowitz, Michael J. (Dartmouth), Cherry Hill, New Jersey
 Mostaghel, Elahe A. (Harvard), Toledo, Ohio

Neimat, Joseph S. (Dartmouth), Potomac, Maryland
 Nettles, Richard E. (Notre Dame), Wadsworth, Ohio
 Obadiah, Joseph M. (Duke), Greensboro, North Carolina
 Pande, Ashvin N. (Harvard), Braintree, Massachusetts
 Park, Eun-Ha (Yale), Pacific Grove, California
 Patil, Chandrashek Y. (North Carolina at Chapel Hill), Charlotte, North Carolina
 Phillips, Harmony K. (Colgate), Carrboro, North Carolina
 Powell, Jeffrey C. (Colgate), Worthington, Ohio
 Price, Nicole (Baylor), Houston, Texas
 Quan, Hai N. (Indiana at Bloomington), Indianapolis, Indiana
 Reeck, Jay B. (Pomona), Mercer Island, Washington
 Reuter, Nancy (Emory), Vero Beach, Florida
 Roberts, O. Adetola (South Carolina at Columbia), Columbia, South Carolina
 Rougier-Chapman, Duncan P. (Duke), Durham, North Carolina
 Routbort, Mark J. (Chicago), Darien, Illinois
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 Sarraf-Yazdi, Shiva (Duke), Durham, North Carolina
 Scarborough, John E. (Georgetown), Raleigh, North Carolina
 Smith, Rachele A. (North Carolina at Chapel Hill), Durham, North Carolina
 Smoak, Charles K. (Duke), Charlotte, North Carolina
 Soltani, Lisa F. (Evergreen State), Bothell, Washington
 Song, Alice (Massachusetts Institute of Technology), Oak Brook, Illinois
 Sorensen, Carsten M. (Duke), Greensboro, North Carolina
 Stolker, Joshua M. (Duke), Gaithersburg, Maryland
 Taylor, Jennifer L. (Stanford), Aurora, California
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 Vanscoy, Lori L. (United States Naval Academy), French Creek, West Virginia
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 Walker, David H. (Washington), Lees Summit, Missouri
 Weaver, Carolyn J. (Cornell Endowed Colleges), Fayetteville, North Carolina
 Weiser, Lori (Stanford), New City, New York
 Wheeler, Kevin G. (Florida), Ft. Meyers, Florida
 Whitener, Tracy R. (Duke), Lenoir, North Carolina
 Wiener, Douglas J. (Pennsylvania), Great Neck, New York
 Williamson, John A. (Dartmouth), Austin, Texas
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 Wong, Carolyn (Stanford), Walnut Creek, California
 Wong, David (Duke), York, Pennsylvania
 Wood, Carrie E. (Emory), Memphis, Tennessee
 Wu, Joy Yee-Jia (Stanford), Voorhees, New Jersey
 Wu, Sean Ming-Yuan (Stanford), Mountain View, California
 Yacoubian, Talene A. (Harvard), Chattanooga, Tennessee
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Class of 1999

Allen, Leigh M. (Vanderbilt), Lexington, Kentucky
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 Blazer, Dan G. (Duke), Cary, North Carolina
 Bleich, Karen B. (Wesleyan), Flushing, New York
 Boozer, Margaret M. (Duke), Atlanta, Georgia
 Brodsky, Michael Coy (Massachusetts Institute of Technology), Melville, New York
 Bronner, Leslie (Duke), Columbia, Maryland
 Brooks, Kelli (Virginia), Falls Mill, Virginia
 Bruce, Stephanie R. (Georgetown), Leicester, North Carolina
 Castellino, Robert (Duke), Durham, North Carolina
 Chang, Daniel H. (California Institute of Technology), Knoxville, Tennessee
 Charles, Kirk L. (Harvard), Brooklyn, New York
 Chen, Elbert W. (Harvard), Pine Brook, New Jersey
 Chen, Hsiupei (Princeton), Florham Park, New Jersey
 Chen, Joyce C. (Stanford), Lubbock, Texas
 Coolidge, David A. (George Mason), Durham, North Carolina

Corkey, William B. (North Carolina State), Raleigh, North Carolina
 Cote, Nicole L. (Virginia), Wilmington, North Carolina
 Crichlow, Brian R. (Carleton), Miami, Florida
 Davila, Marco L. (Texas Christian), Rockwall, Texas
 Dawes, Donald M. (Cornell), Alexandria, Virginia
 Dezfulian, Cameron (Florida), Plantation, Florida
 Dong, Xiang D. (Massachusetts Institute of Technology), Brooklyn, New York
 Dooley, Kelly E. (Northwestern), Durham, North Carolina
 Engler, Susanne M. (Cornell), East Meadow, New York
 Ennis, Francis, Jr. (Yale), Wellesley, Massachusetts
 Garg, Rahul (Massachusetts Institute of Technology), Miami, Florida
 Gartner, Anne E. (Stanford), Edina, Minnesota
 Glasgow, Sean (Duke), Colorado Springs, Colorado
 Greenman, Herb E. (Pennsylvania), Charlotte, North Carolina
 Grubbs, Elizabeth G. (Duke), Greensboro, North Carolina
 Handy, Michael H. (North Carolina at Chapel Hill), Winston-Salem, North Carolina
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 Heinly, Craig S. (Duke), Durham, North Carolina
 Heron, Kerrieanne A. (Emory), Orlando, Florida
 Hewitt, John D. (North Carolina State), Durham, North Carolina
 Hickey, Jason D. (Colgate), Norcross, Georgia
 Horn, Meyer A. (Texas at Austin), Memphis, Tennessee
 Huang, Benjamin Y. (North Carolina at Chapel Hill), Chapel Hill, North Carolina
 Hughes, Solon G. (North Carolina at Chapel Hill), Durham, North Carolina
 Jaquette, Brian A. (Duke), Scotia, New York
 Kane, Henry S., IV (Swarthmore), Chevy Chase, Maryland
 Kaz, Andrew M. (Duke), Durham, North Carolina
 Kherani, Aftab R. (Duke), Grafton, Ohio
 Kong, Garheng A. (Stanford), Fresno, California
 Koshy, Anita A. (Stanford), Albuquerque, New Mexico
 Krzymowski, David (Brigham Young), Orem, Utah
 Kuo, Anita (William Marsh Rice), Seabrook, Texas
 Lallemand, Roger (Harvard), Harrison, New York
 Lang, Jason E. (Johns Hopkins), Durham, North Carolina
 Laubach, Jacob (Swarthmore), Whitefish Bay, Wisconsin
 Lee, Anna (Duke), Cary, North Carolina
 Lee, Samson (North Carolina at Chapel Hill), Burlington, North Carolina
 Lewis, Yalonda Smith (Maryland Baltimore), Woodlawn, Maryland
 Lund, Lars (Charleston), Durham, North Carolina
 Luo, Xunrong (Tsinghua University, China), Durham, North Carolina
 Malinzak, Robert (Davidson), Winston-Salem, North Carolina
 Malooly, Catherine (William and Mary), Green Bay, Wisconsin
 Massenburg, Donald (Haverford), Durham, North Carolina
 McAllister, Ann K. (Davidson), Wilmington, North Carolina
 McDonald, Brian M. (Notre Dame), Webster, Texas
 Merchant, Audrea K. (Tampa), Tampa, Florida
 Mick, Nathan W. (Notre Dame), Midland, Michigan
 Miller, Chad M. (Stanford), Beresford, South Dakota
 Mobisson, Kathrine (Wellesley), Norwood, Massachusetts
 Moff, Irene Kaplan (Duke), Silver Spring, Maryland
 Moff, Stephen L. (Duke), Greensboro, North Carolina
 Moody, Michael A. (Duke), Greensboro, North Carolina
 Moon, Suk J. (Duke), Jacksonville, Florida
 Moreira, Sandra P. (Duke), Cincinnati, Ohio
 Morgan, Nancy S. (Clemson), Boone, North Carolina
 Neujahr, David C. (Duke), Madison, Wisconsin
 Olson, Ty J. (Stanford), Bremerton, Washington
 Parker, Libbie L. (Duke), Bradenton, Florida
 Peterson, Cathleen (Arizona), Durham, North Carolina
 Rahman, Nadeem U. (Duke), Durham, North Carolina

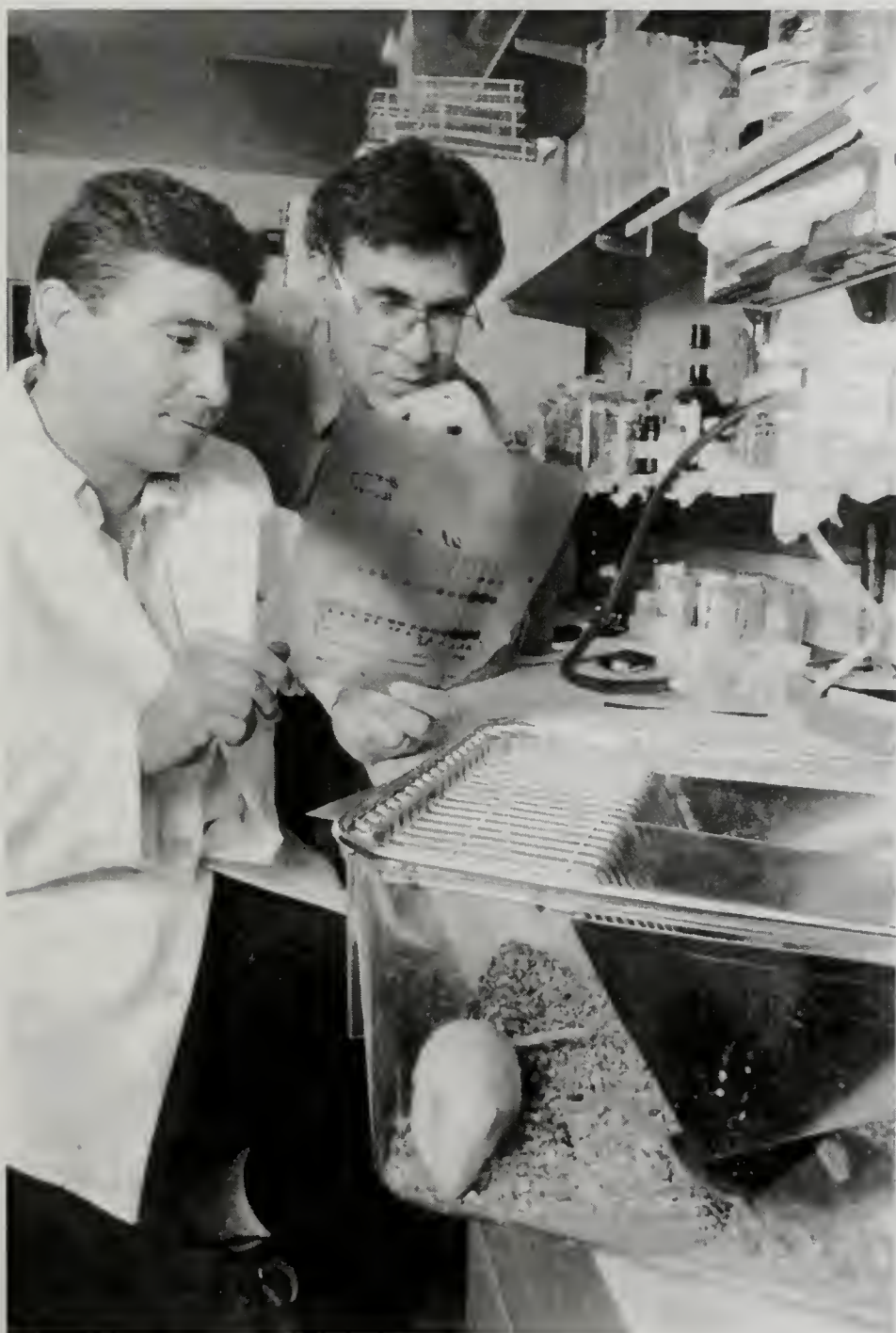
Rahn, Karyn W. (Indiana at Bloomington), Durham, North Carolina
 Resta, Lee P. (Chicago), Valencia, Pennsylvania
 Rhorer, Anthony S. (Arizona), Chandler, Arizona
 Rosas, Humberto G. (Stanford), San Antonio, Texas
 Rosen, Allison B. (Pennsylvania), Durham, North Carolina
 Scanga, Daniel R. (North Carolina at Chapel Hill), Chapel Hill, North Carolina
 Shah, Jita C. (North Carolina at Chapel Hill), Cary, North Carolina
 Siddiqui, Nouman (Duke), Orlando, Florida
 Stamat, Jocelyn C. (Harvard), Chapel Hill, North Carolina
 Sudarshan, Sunil (Duke), Wichita Falls, Texas
 Taylor, Wendy L. (William and Mary), Chapel Hill, North Carolina
 Tong, Betty C. (Georgia Institute of Technology), Atlanta, Georgia
 Toth, Lori R. (North Carolina State), Cary, North Carolina
 Twersky, Joy M. (Cornell), Randolph, New Jersey
 Venable, Carol L. (Duke), Nashville, Tennessee
 Vinson, Emily N. (Furman), Orange Park, Florida
 Walton, Aaron L. (William and Mary), Hampton, Virginia
 Watke, Paula L. (California-Los Angeles), Atlanta, Georgia
 Whang, Peter G. (Harvard), Beaver Dam, Wisconsin
 Williams, Matthew L. (Duke), Birmingham, Alabama
 Winkle, Brooke E. (Harvard), Palo Alto, California
 Worrell, Stewart S. (Duke), Lexington, Virginia
 Wyatt, Christina M. (Duke), Greensboro, North Carolina
 Yin, Zi (Davidson), Durham, North Carolina

Class of 2000

Agarwal, Swati (Duke), Hollidaysburg, Pennsylvania
 Alan, Rodney K. (Morehouse), Tallahassee, Florida
 Allen, Brandy M. (Kansas), Durham, North Carolina
 Amos, Ankie-Marie (Wheaton), Elyria, Ohio
 Bagley, Carlos A. (Duke), Jonesboro, Georgia
 Bauman, Monica J. (California at Los Angeles), Chapel Hill, North Carolina
 Bindal, Vishal (Duke), McLean, Virginia
 Brittin, Katherine B. (Yale), Des Moines, Iowa
 Bruch, Suzanne M. (California Institute of Technology), Durham, North Carolina
 Burnett, Daniel R. (Pennsylvania), Greenfield, Massachusetts
 Carlson, Marie A. (North Carolina State), Fayetteville, North Carolina
 Cherwek, David H. (North Carolina at Chapel Hill), Fredericksburg, Virginia
 Ching, Christine D. (Wellesley), Santa Ana, California
 Citrin, Deborah E. (North Carolina State), Thomasville, North Carolina
 Cole, Vanessa R. (Cornell), Albuquerque, New Mexico
 Davenport, Susan E. (North Carolina at Chapel Hill), Hickory, North Carolina
 Davidson, Jesse A. (Yale), Washington, District of Columbia
 Denny, John P. (North Carolina State), Asheville, North Carolina
 Foma, Fatu M. (Florida A & M), Tallahassee, Florida
 Foster, William T. (California Institute of Technology), Annandale, Virginia
 Franklin, Kendra M. (Ohio State), Gahanna, Ohio
 Green, Ari J. (Miami), Durham, North Carolina
 Grunberg, Gregory E. (Amherst), New York, New York
 Hardison, Jeremy L. (Duke), Durham, North Carolina
 Harrild, David M. (Dartmouth), Durham, North Carolina
 Helm, Hughes M. (North Carolina at Charlotte), Chapel Hill, North Carolina
 Ho, Janie A. (Harvard), Chapel Hill, North Carolina
 Holley, Christopher L. (Duke), Apex, North Carolina
 Holmes, Jarrod P. (Duke), Easley, South Carolina
 Huang, Xuewei (Massachusetts Institute of Technology), Brookline, Massachusetts
 Hueman, Matthew T. (United States Military Academy), Golden, Colorado
 Jacobs, Michael K. (Vanderbilt), Stone Mountain, Georgia
 James, Felice A. (Duke), Marion, South Carolina
 Jenkin, Janet (Duke), Whitehouse Station, New Jersey
 Jones, Michael R. (Duke), Fayetteville, North Carolina
 Jones, Relief, III (Stanford), Buras, Louisiana
 Kaplan, Andrew L. (Duke), Woodbury, New York

Kasibhatla, Mohit S. (Columbia), Greensboro, North Carolina
 Kayes, Andrew V. (Duke), Cincinnati, Ohio
 Kendelhardt, Jason D. (Wake Forest), Matthews, North Carolina
 Kim, Eun Y. (Harvard), Bayside, New York
 Lawson, William T., Jr. (Duke), Lakeland, Florida
 Le, Thuy (California at Los Angeles), Bakersfield, California
 Lightfoot, Paula S. (Cincinnati), Forth Thomas, Kentucky
 Lindauer, Kelly R. (Colorado-Boulder), Denver, Colorado
 Mallette, Quinterol J. (Duke), Hartford, Connecticut
 Marcus, Stacy J. (Duke), Silver Spring, Maryland
 Martin, Jamila C. (Duke), Berkeley, California
 Maurer, Carter J. (Duke), Ashland, Oregon
 McCall, Shannon J. (North Carolina State), High Point, North Carolina
 McDaniel, Benjamin B. (Duke), Grand Junction, Colorado
 McIntire, Katherine N. (California at Los Angeles), Solana Beach, California
 McMahon, Connette P. (Duke), Granite Quarry, North Carolina
 McNamara, Bridget T. (North Carolina State), Burlington, North Carolina
 Mills, Tara A. (Winston-Salem State), Wilson, North Carolina
 Moore, Frederick D. (United States Naval Academy), Durham, North Carolina
 Odom, Audrey R. (Duke), High Point, North Carolina
 Olson, Michael R. (Harvey Mudd), East Greenwich, Rhode Island
 Ormsbee, Susan M. (Yale), New Bern, North Carolina
 Palestrant, Daniel (Johns Hopkins), Phoenix, Arizona
 Patel, Prerana N. (William Marsh Rice), Hickory, North Carolina
 Patel, Vikas J. (Duke), Cary, North Carolina
 Payne, Joseph R. (Georgia Institute of Technology), Greenville, North Carolina
 Peterson, Erica L. (Nebraska at Lincoln), Lincoln, Nebraska
 Pond, Kyle K. (Duke), Cape Elizabeth, Maine
 Posther, Katherine E. (Harvard), Fort Wayne, Indiana
 Pradhan, Aditte A. (Duke), Des Moines, Iowa
 Pradhan, Ashutosh A. (Johns Hopkins), Dix Hills, New York
 Quayle, Frank J., IV (Princeton), Charlottesville, Virginia
 Rad, Ariel N. (Princeton), Holmdel, New Jersey
 Radkowski, Christopher A. (Johns Hopkins), Greensburg, Pennsylvania
 Ravin, Adam G. (Vanderbilt), Durham, North Carolina
 Recanati, Maurice Andre (Rensselaer Poly Institute), New York, New York
 Reed, Robyn C. (Wake Forest), Durham, North Carolina
 Rose, Daniel T. (North Carolina at Chapel Hill), Nashville, North Carolina
 Ruan, Daniel T. (Middlebury), Trumbull, Connecticut
 Saldanha, Charles E. (Emory), Rochester, New York
 Scholnick Joshua D. (Yale), Williamsburg, Virginia
 Sheetz, Jonathan P. (North Carolina at Chapel Hill), Durham, North Carolina
 Shih, George L. (Duke), Lexington, Kentucky
 Smith, Brian A. (Vanderbilt), St. Albans, West Virginia
 Smith, Eric G. (Johns Hopkins), Durham, North Carolina
 Snyder, Laurie D. (De Pauw), Westerville, Ohio
 Soni, Sejal R. (Yale), Marietta, Georgia
 Stohr, Bradley A. (Swarthmore), Sacramento, California
 Sullivan, Michael D. (Harvard), River Ridge, LA
 Tai, Oliver S. (Harvard), Germantown, Tennessee
 Tweedy, Damon S. (Maryland Baltimore County), Lanham, Maryland
 Wang, Stephen L. (Kentucky), Lexington, Kentucky
 Wellons, Melissa F. (Duke), Durham, North Carolina
 White, Brent C. (Emory), Columbus, Georgia
 Wilfert, Rachel A. (Amherst), Chapel Hill, North Carolina
 Wong, Jimmie C. (Columbia University), Monterey Park, California
 Wong, Stephen (California Institute of Technology), Los Angeles, California
 Wu, Zhenqing (Franklin and Marshall), Durham, North Carolina
 Wurth, Kathleen, (North Carolina at Chapel Hill), Bethlehem, Pennsylvania
 Yowell, Charles W. (Duke), Durham, North Carolina
 Yuan, Shan (Oberlin), Milpitas, California
 Zamah, Alberuni M. (William Marsh Rice), Kansas City, Missouri
 Zaref, Jeffrey I. (Harvard), Haworth, New Jersey

Zhang, Ming M. (California-Berkeley), Durham, North Carolina
Zhu, Hui (Peking University, China), Malden, Massachusetts
Zomorodi, Ali R. (Duke), Winter Haven, Florida



Class of 1996 with Postgraduate Year One Appointment*

Key: *Student, Name, Hometown, Internship Institution and Discipline (if applicable), City and State, Residency Institution and Discipline, City and State, Ultimate Career Choice.*

- Advani, Anjali Sunder (Columbus, Ohio) Duke University Medical Center, Durham, North Carolina-Hematology/Oncology
Anthony, Evelyn Young (Sumter, South Carolina) Bowman Gray School of Medicine-Baptist Hospital, Winston Salem, North Carolina-Diagnostic Radiology
Armstrong, Christine Bernadette (Birmingham, Alabama) Vanderbilt University, Nashville, Tennessee-Pediatrics
Axelrod, David A. (Milwaukee, Wisconsin) University of Michigan, Ann Arbor, Michigan-General Surgery
Baird, Paul Theodore, Jr. (Atlanta, Georgia) Duke University Medical Center, Durham, North Carolina-Internal Medicine
Berkowitz, Beth Jo (Miami, Florida) Children's Memorial Hospital, Chicago, Illinois-Pediatrics
Bernstein, Crystal L. (Asheville, North Carolina) Vanderbilt University, Nashville, Tennessee-Internal Medicine
Biswas, Shankha Suvra (Chapel Hill, North Carolina) Duke University Medical Center, Durham, North Carolina-General and Thoracic Surgery
Brenner, Louis (Peabody, Maryland) Brigham and Women's Hospital, Boston, Massachusetts-Internal Medicine
Bulsara, Kethan Ramanlal (Charlotte, North Carolina) Duke University Medical Center, Durham, North Carolina-Surgery-Academic Neurosurgery
Busquets, Miguel A. (Ponce, Puerto Rico) Roanoke Memorial Hospital, Roanoke, Virginia-Transitional; Washington University Medical Center, St. Louis, Missouri-Ophthalmology-Academic Ophthalmology
Chambers, Robert Andrew (Campbellsville, Kentucky) Yale University, New Haven, Connecticut-Psychiatry
Chang, Albert Shou-Yen (Morgantown, West Virginia) Baylor College of Medicine, Houston, Texas-Cardiovascular and Thoracic Surgery
Cheng, Elbert Tze-Chin (Mountain View, California) Stanford University, Stanford, California-Otolaryngology
Chui, Stephen Yun-Chi (Burlington, Ontario, Canada) Duke University Medical Center, Durham, North Carolina-Internal Medicine
Clay, Sara Ellen Larson (Dunwoody, Georgia) Boston University, Boston, Massachusetts-Internal Medicine
Clowse, Martin Converse (Greensboro, North Carolina) Vanderbilt University, Nashville, Tennessee-General Internal Medicine
Coffey, Gina DiRenzo (Flanders, New Jersey) Children's Memorial Hospital of Illinois, Chicago, Illinois-Pediatrics
Colvin, Richard Anthony, Jr. (West Hempstead, New York) Brigham and Women's Hospital, Boston, Massachusetts-Internal Medicine
Crowley, Steven Daniel (Columbus, Georgia) Duke University Medical Center, Durham, North Carolina-Internal Medicine
Cusmariu, Jeffrey Ross Cusmariu (West Orange, New Jersey) University of Alabama, Birmingham, Alabama-Orthopaedic Surgery
Dauterman, John Frederick (Raleigh, North Carolina) University of Utah, Salt Lake City, Utah-Pathology
DiCuccio, Michael (Gastonia, North Carolina) Duke University Medical Center, Durham, North Carolina-General Internal Medicine
Downey, William E. (Durham, North Carolina) Brigham and Women's Hospital, Boston, Massachusetts-Internal Medicine
Durgin, Harry Watson, Jr. (Madison, Alabama) University of Southern California, Los Angeles, California-Orthopaedic Surgery
Eaton Jones, Suzanne Elizabeth (New York, New York) Moses Cone Memorial Hospital, Greensboro, North Carolina-Family Practice
Eng, Michael Allen (Baltimore, Maryland) Beth Israel Medical Center, New York, New York-Pathology
Erens, Greg A. (Northbrook, Illinois) Beth Israel Hospital, Boston, Massachusetts-Orthopaedic Surgery
Evanoff, Allison M. (Seneca, Pennsylvania) North Carolina Memorial Hospital, Chapel Hill, North Carolina-Family Medicine

*Hometown does not denote legal residence.

Fetko, Linda Louise (Miami, Florida) Duke University Medical Center, Durham, North Carolina-Obstetrics and Gynecology

Flynn, Matthew Kent (Oakland, California) University of California, San Francisco, California-Internal Medicine-Dermatology

Flynn, Theresa Marie McCarthy (Brockton, Massachusetts) University of California, San Francisco, California-Pediatrics

Fralix, Teresa A. (Charleston, South Carolina) University of Virginia, Charlottesville, Virginia-Family Practice

Galdino, Gregory Michael (Camp Hill, Pennsylvania) Johns Hopkins Hospital, Baltimore, Maryland-Plastic Surgery

Hage, William Dirk (Durham, North Carolina) Emory University, Atlanta, Georgia-Orthopaedic Surgery

Haisley-Royster, Camille Ann Michelle (Kingston, Jamaica) St. Vincent's Medical Center, Jacksonville, Florida-Family Medicine

Hamilton, Penny Jo (Fairmont, West Virginia) University of North Carolina, Chapel Hill, North Carolina-Emergency Medicine

Hardacre, Jeffrey M. (Marshfield, Wisconsin) Johns Hopkins Hospital, Baltimore, Maryland-Gastrointestinal Surgery

Hardee, Michael Wayne (Greenville, North Carolina) Medical University of South Carolina, Charleston, South Carolina-Family Practice

Hare, Charles Bradley (Morgantown, West Virginia) Massachusetts General Hospital, Boston, Massachusetts-Internal Medicine

Haque, Tehmina (Head of the Harbor, New York) Winthrop University Hospital, Mineola, New York-Ophthalmology; Wills Eye Hospital, Philadelphia, Pennsylvania-Ophthalmology

Hepburn, Matthew Jerrad (Ann Arbor, Michigan) Brooke Army Medical Center, San Antonio, Texas-Internal Medicine-Academics

Horowitz, Neil Stuart (Gastonia, North Carolina) University of Washington, Seattle, Washington-General Obstetrics and Gynecology

Howard, Gayle Charlyne (Richmond, Virginia) Carilion Health System, Roanoke, Virginia-Transitional; Baylor College of Medicine, Houston, Texas-Ophthalmology

Iacobucci, Mark John (Poquoson, Virginia) Roanoke Memorial Hospital, Roanoke, Virginia-Transitional; Wills Eye Hospital, Philadelphia, Pennsylvania-Ophthalmology

Idriss, Salim Farouk (Evanston, Illinois) University Hospitals of Cleveland-Rainbow Babies and Children's Hospital, Cleveland, Ohio-Pediatrics

Jacobs, Michael Todd (Bradenton, Florida) Duke University Medical Center, Durham, North Carolina-Cardiothoracic Surgery

Johnson, Beth Gibbs (Slidell, Louisiana) Georgetown University, Washington, DC-Internal Medicine

Jones, Thomas Edward (Billings, Montana) University of Tennessee College of Medicine, Memphis, Tennessee-Family Practice

Kadmas, Warren Ross (Sheridan, Wyoming) David Grant Medical Center, Travis Air Force Base, California-Orthopaedic Surgery

Kang, Esther Hawon (Canton, Ohio) Newton-Wellesley Hospital, Newton, Massachusetts-Internal Medicine; Brigham and Women's Hospital, Boston, Massachusetts-Radiology

Kaplan, Seth David (Harriman, New York) Boston Combined Program in Pediatrics - Primary Care Track, Boston, Massachusetts-General Pediatrics

Kelly, Bryan T. (West Redding, Connecticut) The New York Hospital, New York, New York, Hospital for Special Surgery-Orthopaedic Surgery

Kenan, Daniel James (Durham, North Carolina) Duke University Medical Center, Durham, North Carolina-Pathology

Kim, Dennis Matthew (White Oak, Pennsylvania) Cambridge Hospital, Cambridge, Massachusetts-Internal Medicine; McLean/Massachusetts General Hospital, Boston Massachusetts-Psychiatry

Krol, Bryan Jeffrey (Cincinnati, Ohio) Indiana University Medical Center, Indianapolis, Indiana-Otolaryngology-Head and Neck Surgery

Lane, Steven C. (Dunn, North Carolina) University of North Carolina -North Carolina Memorial Hospital, Chapel Hill, North Carolina-Internal Medicine; Massachusetts General Hospital, Boston, Massachusetts-Academic Radiation Oncology

Lapp, Julie Ann (Portland, New York) Georgetown University, Washington, DC-Internal Medicine

Lee, David Marvin (Fosston, Minnesota) Stanford University, Residency Deferred

Lenczowski, Joi Michele (St. Louis, Missouri) Duke University Medical Center, Durham, North Carolina-Internal Medicine-Academic Dermatology

Liao, Lawrence (Laurinburg, North Carolina) Vanderbilt University, Nashville, Tennessee-Internal Medicine

Mansbach, Jonathan Miles (Memphis, Tennessee) Boston Children's Hospital, Boston, Massachusetts-Pediatric Cardiology/Emergency Medicine

Marathe, Umesh S. (Buffalo, New York) Tripler Army Medical Center, Honolulu, Hawaii-General Surgery

Marshak, Jennifer Dale (Dix Hills, New York) North Shore University Hospital, Manhasset, New York-Academic Obstetrics and Gynecology

May, Christopher Walter (Rochester, New York) Maine Medical Center, Portland, Maine-Internal Medicine-Primary Care

Melnick, Jeffrey Ronald (Danville, Virginia) Barnes Jewish Hospital-Washington University, St. Louis, Missouri-Academic Pathology

Moore, Lisa Eileen (Bastrop, Louisiana) University of Minnesota, Minneapolis, Minnesota-Academic Obstetrics and Gynecology

Nasser, Caththerine Michel (Beirut, Lebanon) University of Illinois, Chicago, Illinois-Orthopaedic Surgery

Newman, Ann Elizabeth (Pensacola, Florida) Residency Deferred

Norris, Edward Robert (Greenville, North Carolina) Massachusetts General Hospital, Boston, Massachusetts-Internal Medicine; Massachusetts General Hospital/McLean Hospital, Boston, Massachusetts-Psychiatry

Norvell, Kristina Elizabeth (Potomac, Maryland) Duke University Medical Center, Durham, North Carolina-Internal Medicine

Ong, Ricardo C. (Ringwood, New Jersey) Johns Hopkins Hospital, Baltimore, Maryland-Emergency Medicine

Paydafar, Joseph Ali (Chapel Hill, North Carolina) Barnes Hospital, Washington University, St. Louis, Missouri-Surgery-Academic Otolaryngology

Pazin, John Gregory (Pittsburgh, Pennsylvania) Duke University Medical Center, Durham, North Carolina-Internal Medicine

Petti, Kathy Anne (Nutley, New Jersey) Duke University Medical Center, Durham, North Carolina-Internal Medicine

Pradhan, Archana A. (Dix Hills, New York) Residency Deferred-Obstetrics and Gynecology

Prosnitz, Robert Glen (Chapel Hill, North Carolina) Beth Israel Hospital, Boston, Massachusetts-Internal Medicine; Joint Center for Radiation Oncology, Boston, Massachusetts-Radiation Oncology

Putman, Shannon (Durham, North Carolina) Johns Hopkins Hospital, Baltimore, Maryland-Internal Medicine

Quan, Long T. (Indianapolis, Indiana) Emory University, Atlanta, Georgia-Internal Medicine-Dermatology

Quarterman, Renee L. (Wilmington, Delaware) Oregon Health Sciences University, Portland, Oregon-Cardiothoracic Surgery

Recchia, Franco Maria (East Detroit, Michigan) William Beaumont Hospital, Royal Oak Michigan-Transitional Medicine; Wills Eye Hospital, Philadelphia, Pennsylvania-Ophthalmology

Rehmus, Wingfield Ellis (Atlanta, Georgia) Residency Deferred-Masters of Public Health, Yale University, New Haven, Connecticut-Dermatology

Rothman, Russell Laurence (Albertson, New York) Duke University Medical Center, Durham, North Carolina-Academic Medicine-Medicine/Pediatrics

Royster, Michael Owen (Burke, Virginia) St. Vincent's Medical Center, Jacksonville, Florida-Family Medicine

Savarase, John J., III (Southbury, Connecticut) The Hospital for Special Surgery, New York, New York-Surgery-Orthopaedics

Skarada, Douglas John (Delaware, Pennsylvania) Barnes Jewish Hospital, St. Louis, Missouri-Surgery-Otolaryngology

Spencer, Edwin Earl (Wilmington, North Carolina) University of Michigan, Ann Arbor, Michigan-Orthopaedics

Steele, Thomas McKeown (Corvallis, Oregon) Providence Medical Center, Portland, Oregon-Internal Medicine

Sumner, William Thomas (Concord, North Carolina) Duke University Medical Center, Durham, North Carolina-Internal Medicine-Dermatology

Tchao, Nadia K. (Auburn, Maine) University of Pennsylvania, Philadelphia, Pennsylvania-Internal Medicine

Tevrizian, Allyson T. (Pasadena, California) University of California, San Francisco, California-Internal Medicine

Verbinski, Steven G. (San Diego, California) University of California, San Francisco, California-General Internal Medicine

Wang, Feng Lei (Oak Ridge, Tennessee) Vanderbilt University, Nashville, Tennessee-Internal Medicine

Weinberg, Jason Brice (Durham, North Carolina) University of Colorado, Denver, Colorado-Pediatrics

Weinberg, Mark Adam (Milwaukee, Wisconsin) Duke University Medical Center, Durham, North Carolina-Academic Medicine, Internal Medicine

Williams, Eric Andrew (Livonia, Michigan) Baylor College of Medicine, Houston, Texas-Critical Care-Pediatrics

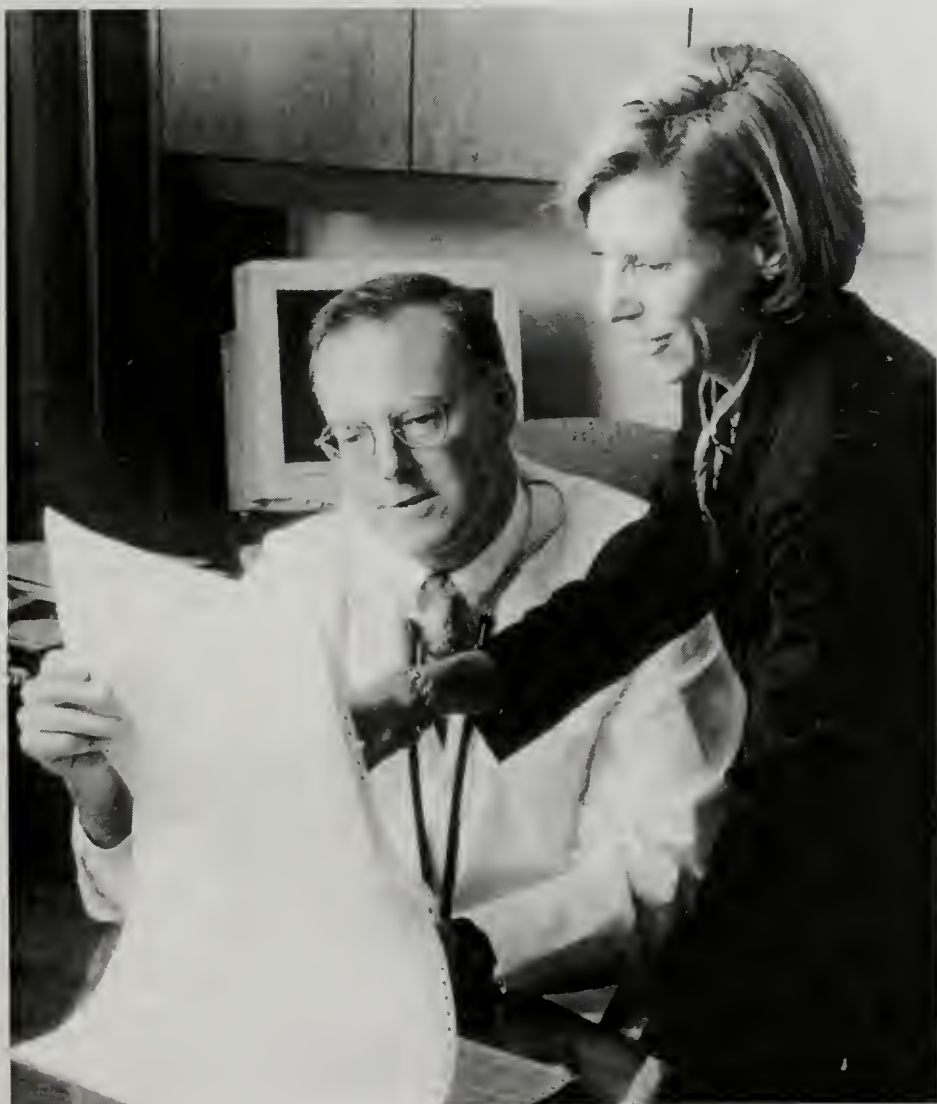
Wimmer, Alan Paul (Logan, Utah) Wilford Hall United States Air Force Medical Center, San Antonio, Texas-Internal Medicine

Yeh, Benjamin Ming-Yueh (Tenafly, New Jersey) Beth Israel Hospital, Boston Massachusetts-Preliminary Medicine; University of California, San Francisco, California-Diagnostic Radiology

Yeh, Mark M. (Bakersfield, California) Duke University Medical Center, Durham, North Carolina-Otolaryngology-Head and Neck Surgery

Yelverton, Cheryl Lynn (Pacoima, California) University of Southern California Medical Center, Los Angeles, California-Surgery

Young, Timothy Noel (Durham, North Carolina) St. Vincent Hospital, Indianapolis, Indiana-Transitional; Washington University, St. Louis, Missouri-Ophthalmology



School of Nursing



The Duke University School of Nursing

The Duke University School of Nursing provides leadership in the health care of people through education, research, and health care delivery. We provide advanced and comprehensive education to prepare students for lifetimes of learning and careers as leaders, practitioners, or as researchers. In addition, faculty and students conduct research that adds to our understanding of health promotion and illness prevention, human responses to illness, and systems of care that facilitate better patient outcomes; and through their practice faculty and students provide compassionate research-based nursing care. Through such work, Duke faculty, students, and graduates are shaping the future of professional nursing practice.

Programs

THE MASTER OF SCIENCE IN NURSING PROGRAM

The School of Nursing offers a flexible, 39 to 45 credit program leading to the Master of Science in Nursing degree. Graduates are prepared as clinical nurse specialists in critical care, gerontology, oncology, or pediatrics; as adult nurse practitioners (with specialization in general primary care, cardiology, or oncology), as gerontological nurse practitioners, family nurse practitioners, acute care nurse practitioners, or pediatric nurse practitioners; and as nurse administrators. Students pursue their educational endeavors with faculty and clinical/consulting associates who have expertise and research in the student's chosen area of specialization. The curriculum is designed to provide maximum flexibility for full-time or part-time study.

The integration of education, practice, and research undergirds the entire curriculum and the behavior of those individuals involved in the educative process. Upon completion of the program, the graduate is able to:

1. Synthesize concepts and theories from nursing and related disciplines to form the basis for advanced practice,
2. Demonstrate expertise in a defined area of advanced practice,
3. Utilize the process of scientific inquiry to validate and refine knowledge relevant to nursing,
4. Demonstrate leadership and management strategies for advanced practice,
5. Demonstrate proficiency in the use and management of advanced technology related to patient care and support systems,
6. Analyze socio-cultural, ethical, economic, and political issues that influence patient outcomes, and

7. Demonstrate the ability to engage in collegial intra- and inter-disciplinary relationships in the conduct of advanced practice.

A student may choose to major in one of the following areas: (1) nursing systems administration (with the option of an informatics focus); (2) adult nurse practitioner (with general primary care, cardiology, or oncology focus); (3) family nurse practitioner; (4) oncology (clinical nurse specialist); (5) gerontology (nurse practitioner or clinical nurse specialist); (6) pediatrics (nurse practitioner or clinical nurse specialist); and (7) acute care nurse practitioner.

THE POST-MASTER'S CERTIFICATE PROGRAM

The School of Nursing offers a post-master's certificate to students who already have an earned M.S.N. from a National League for Nursing accredited program and are seeking specialized knowledge within a major offered in the school's master's program. The number of credits required to complete the certificate program varies by major; the student must successfully complete the required courses in the chosen nursing major. Completion of the certificate program is documented in the student's academic transcript. Depending upon the major, the student may then meet the qualifications for advanced practice certification in the specialty area. For example, students who complete the post-master's certificate in the nurse practitioner majors are eligible to sit for certification examinations.

Admission and Progression

ADMISSION REQUIREMENTS FOR THE MASTER'S DEGREE

1. Bachelor's degree with an upper division nursing major from a program accredited by the National League for Nursing. The bachelor's or post-bachelor's course work must include satisfactory completion of a course in descriptive and inferential statistics.
2. It is recommended that applicants have a minimum of one year of nursing experience before matriculation. Students for whom an exception is made will be advised to take core courses in the first year of study and to work to meet the experience requirement.
3. Undergraduate grade point average of 3.0 on a 4.0 scale.
4. Satisfactory performance on the Graduate Record Examination (G.R.E.) or Miller Analogies Test (M.A.T.).
5. Eligibility to be licensed as a professional nurse in North Carolina.*

*Candidates for admission to the Duke University School of Nursing must obtain a license to practice in the state of North Carolina before matriculation. Offers of admission to the School of Nursing cannot be considered final until matriculants present proof of licensure to the Office of Admissions no later than the end of the first day of class during the semester of matriculation.

Students enrolled in the Graduate School of Nursing must maintain a current North Carolina license and are required to show proof of licensure, or status of renewal of license, to the admissions officer on a yearly basis (January).

Information on licensure procedures for the state of North Carolina may be obtained from the North Carolina Board of Nursing, P. O. Box 2129, Raleigh, North Carolina 27602, or by calling 919-782-3211 or 919-733-5356.

6. Documentation of the acquisition of physical assessment knowledge and skills, for those applicants choosing a clinical specialty.
7. Three references attesting to personal and professional qualifications. At least two references must be from former employers, faculty members, or deans.
8. Personal interview. Other arrangements may be considered when distance is a factor.
9. Basic computer skills are required prior to matriculation.

Selection will be based on the applicant's qualifications, intellectual curiosity, potential for professional growth, and contributions to the profession. Exception to any of the admission requirements will be considered on an individual basis.

ADMISSION REQUIREMENTS FOR THE POST-MASTER'S CERTIFICATE OPTION

1. Completion of application for certificate program including undergraduate and graduate transcripts. The bachelor's or post-bachelor's course work must include satisfactory completion of a course in descriptive and inferential statistics.
2. Minimum of one year's experience in nursing.
3. A master's degree from an N.L.N. accredited school of nursing.
4. Licensure or eligibility for licensure as a registered nurse in North Carolina.
5. Documentation of the acquisition of physical assessment knowledge and skills, for those applicants choosing a clinical specialty.
6. Two letters of academic and/or professional reference.
Interview with a faculty member in the specialty area.

HEALTH AND IMMUNIZATION RECORD

North Carolina law requires all new students to present proof of certain immunizations before matriculation. The Duke University Student Health Immunization Form and Report of Medical History, furnished by Duke University, should be completed and returned to the Director of Student Health Services, Box 2899 DUMC, Duke University, Durham, North Carolina 27710 (919-684-3367).

It is preferable for students to arrive on campus with complete, verified immunization forms. For those who are unable to do so, the Durham County Health Department (560-7600) on Main Street provides some of the necessary inoculations free of charge. On-campus inoculations are available through Student Health Services (684-3367). A special immunization clinic is held during the days when new students arrive on campus, with a nominal charge for on-campus immunizations.

ADDITIONAL ADMISSION REQUIREMENTS FOR INTERNATIONAL APPLICANTS

International students provide a unique cultural and personal addition to Duke. They are encouraged to apply early in the academic year prior to the year they wish to attend Duke to ensure time to complete the following additional requirements:

1. evidence of adequate financial support for the duration of the program;
2. a minimum score of 550 on the Test of English as a Foreign Language (T.O.E.F.L.) if English is not the primary language;

3. a passing score on the Commission on Graduates of Foreign Nursing Schools (C.G.F.N.S.) examination.

The Commission on Graduates of Foreign Nursing Schools (C.G.F.N.S.) examination is a prerequisite for taking the Registered Nurse Licensing examination in the state of North Carolina and for obtaining a nonimmigrant occupational preference visa (H1-A) from the United States Immigration and Naturalization Service. C.G.F.N.S. offers a two-part certification program that includes a credentials review, followed by a test of nursing and English language skills. The C.G.F.N.S. examination is given in March, August, and November. Application materials may be requested from C.G.F.N.S., 3624 Market Street, Philadelphia, Pennsylvania 19014 (215-349-8767). The registration deadlines for these exams are approximately four months prior to their administration. Early application is therefore essential. For further information, contact the School of Nursing Office of Admissions.

ADMISSION PROCEDURE

An applicant to the Duke University School of Nursing Graduate Program must obtain an application form from the School of Nursing Office of Admissions. A check or money order for the nonrefundable processing fee of \$50 must accompany each application. In addition, the applicant should provide the following supporting documents:

1. two copies of the official transcript from each college or university attended, to be sent directly to the School of Nursing Office of Admissions;
2. two supplementary transcripts showing completion of work that was in progress when the earlier transcripts were obtained, if necessary;
3. three letters of recommendation (on forms provided by the School of Nursing) by persons qualified to judge the applicant as a prospective graduate student, to be mailed directly to the Office of Admissions (at least two must be from current or former employers, faculty members, or deans); and,
4. for master's degree applicants, scores from the Graduate Record Examination (G.R.E.) or Miller Analogies Test (M.A.T.) that are not more than five years old.

Testing dates and locations for the Graduate Record Examination can be obtained from most colleges or from the Educational Testing Service, P. O. Box 6000, Princeton, New Jersey 08541-6000 (609-771-7670 or 510-654-1200). Information for the Miller Analogies Test can be obtained from The Psychological Corporation, 555 Academic Court, San Antonio, Texas 78204-3956 (210-921-8801 or 800-622-3231). Information also may be obtained from Duke University's Office of Counseling and Psychological Services (C.A.P.S.) (919-660-1020). The number to use on the G.R.E. to indicate that you want a copy of your scores sent to the School of Nursing is *R5173*. The number to use on the M.A.T. is *2734*.

Once all of the above information is received by the Office of Admissions, a faculty member will contact the applicant and arrange a personal interview.

CONSIDERATION OF APPLICATION

The application will be considered when all forms have been received by the School of Nursing Office of Admissions. Complete applications to the Duke University School of Nursing Graduate Program must be submitted by the following dates:

March 1 (fall and summer semesters);
November 1 (spring semester).

It is the responsibility of the applicant to ensure that the School of Nursing Office of Admissions receives all required materials before the deadline.

Notification of Status. Admission may be approved, deferred, or rejected. If admission is approved, the applicant will receive a letter of admission and acceptance forms. The process

of admission is not complete until the acceptance forms and nonrefundable tuition deposit of \$100 have been received by the School of Nursing Office of Admissions. This fee will be credited toward tuition. Applicants whose admission is deferred or rejected will be notified by letter. Applicants who wish to be considered for financial assistance are highly encouraged to complete and submit a free Application for Federal Student Aid as soon as possible *before applying for admission*.

FULL-TIME AND PART-TIME DEGREE STATUS

Opportunities for part-time and full-time study are available. Full-time status is defined as taking a minimum of nine (9) credits per semester, excluding summer session when fewer credits may be taken. Students who wish to change from full-time or part-time status must request permission from the dean.

NONDEGREE STUDENTS

Individuals may take graduate level courses as a nondegree student, provided they have a bachelor of science in nursing degree from a National League for Nursing accredited school. Nondegree students are admitted to individual classes by permission of the instructor on a space available basis. To apply, an official copy of all undergraduate nursing transcripts must be sent to the School of Nursing Office of Admissions along with a completed Application for Admission as a nondegree student and a \$50 application fee. Students who register for clinical courses also must submit two letters of reference from their employer and evidence of licensure as a nurse in the state of North Carolina.

All nondegree application requirements must be received by the deadline for the semester during which the course will be offered (cf. "Consideration of Application" in this book). Requests for nondegree status will be considered within two weeks after the appropriate deadline. If permission is granted by the faculty, the student will be notified by the Office of Admissions. (Nondegree students requesting a second course make the request to the School of Nursing Office of Admissions.) Up to seven credits earned as a nondegree student are accepted for credit towards the M.S.N. degree if the applicant is later admitted to the master's program.

TRANSFER OF GRADUATE CREDITS

A maximum of six units of graduate credit may be transferred for graduate courses completed at other accredited institutions (or in other graduate programs at Duke). Transfer credit will be given only for academic work completed within five years before matriculation at Duke. Such units are transferable only if the student has received a grade of B (3.0 or its equivalent) and after the student has earned a minimum of 6 units of graduate credit at Duke University School of Nursing. A student wishing to transfer course work should make a written request, and provide a syllabus or some other description of the course to his/ her academic advisor.

TRANSFER TO ANOTHER GRADUATE NURSING MAJOR

A change of graduate nursing major may be made, contingent upon approval of the faculty involved. Should a change be made, a student must meet all requirements of the new major.

TIME FOR COMPLETION OF THE MASTER'S DEGREE

The master's degree student should complete all requirements for the degree within five calendar years from the date of initial matriculation. No full-time residence is required; however, all students enrolled in the school who have not been granted a leave of absence by the dean must register each fall, spring, and summer until all degree requirements are completed.

ADVISEMENT

An interim academic advisor for each student is assigned on admission to the program. After consultation with the interim and proposed advisors, students select their permanent advisor according to their clinical and research interests in the area of study. This advisor assists the student in planning and implementing his/her course of study throughout the master's program.

GRADES

All courses counting toward the master's degree must be taken for the following grades: *A* (4.0); *A-* (3.7); *B+* (3.3); *B* (3.0); *B-* (2.7); *C+* (2.3); *C* (2.0); *C-* (1.7).

Master's Degree students with a GPA of less than 2.7 after completing 20 credits will be asked to withdraw from the program. Post-Master's Certificate students with a GPA of less than 2.7 after completing 10 credits will be asked to withdraw from the program. An *F* (0.0) in any graduate level course will result in administrative withdrawal from the program at the end of the semester in which the grade is received.

In case of illness or other nonacademic problems, it is the student's responsibility to negotiate with the professor for an *I* (incomplete grade). In the case of an *I*, the professor issuing the *I* will specify the date by which the student is to remove the deficiency; in no case will this be more than one calendar year from the date the course ended.

WITHDRAWAL FROM A COURSE

Students may make changes in their schedule during the two week drop/add period at the beginning of the fall and spring semesters and during the first three days of the summer semester. A fee is charged by the university if changes are made after that period. If a student withdraws from a course after the drop/add period, the progress of the student at the time of withdrawal from the course will be indicated on the record as *Withdrew Passing (WP)* or *Withdrew Failing (WF)*.

INTERRUPTION OF PROGRAM AND WITHDRAWAL FROM THE GRADUATE PROGRAM

The School of Nursing reserves the right, and matriculation by the student is a concession of this right, to request the withdrawal of any student whose performance at any time is not satisfactory to the School of Nursing. If a student for any reason wishes to withdraw from the school, notification should be made to the dean before the expected date of withdrawal. Students who have withdrawn from the program must apply for readmission according to regular admission policies.

Students who find it necessary to interrupt their program of study should request in writing a leave of absence addressed to the dean of the School of Nursing. A maximum of one calendar year's leave may be granted; this will be counted toward the total time allowed to complete the program.

COMMENCEMENT

Graduation exercises are held once a year, in May, when degrees are conferred and diplomas issued to students who have completed all requirements. Students who complete degree requirements by the end of the fall or by the end of the summer term receive diplomas dated December 30 or September 1, respectively. There is a delay in the mailing of September and December diplomas because diplomas cannot be issued until they are approved by the Academic Council and Board of Trustees. All graduates, including those receiving degrees in December and September, are expected to attend graduation exercises in May.

Requirements for the Master's Degree

Each of the school's majors requires the completion of 39 to 45 units of credit. These units include core courses required of all master's students, the research option (either the thesis, a research project, or a course in research utilization), courses in the major, and electives. Each major requires the student to complete a clinical residency.

Required Core Courses	Credits
N301. Theoretical Foundations of Advanced Nursing Practice	3
N302. Nursing Informatics	2
N303. Issues in Contemporary Health Care Organizations	3
N307. Research Methods	3
N308. Applied Statistics	2
Total	13

Research Options (Select One)*	Credits
N312. Research Utilization in Advanced Nursing Practice	3
N313. Thesis	6
N314. Nonthesis Option	6
Total	3-6

Major Fields of Study

NURSING SYSTEMS ADMINISTRATION

The major in Nursing Systems Administration focuses on changes in the health care delivery system, models of nursing care delivery, financial management and patient outcomes. The total minimum number of credits required for graduation is 39. Course work in the major includes the following:

	Credits
N340. Administration of Nursing Systems I	3
N344. Administration of Nursing Systems II	3
N348. Financial Management and Budget Planning	4
N345. Nursing Administration Residency	3-9
Electives/Independent Study	3-12
Total	21-24

INFORMATICS OPTION

	Credits
N347. Informatics Issues in Nursing Systems	2
N349. Nursing Informatics Theory and Application	3
N343. Nursing Informatics Residency	3-9
Total	8-14

NURSE PRACTITIONER MAJORS

The majority of nurse practitioner majors focus on the knowledge and skills necessary to provide primary care across settings, including care of individuals in rural and underserved areas. The Acute Care Nurse Practitioner major focuses on the knowledge and skills to provide care to individuals (including the critically ill) during hospitalization. The total minimum number of credits required for graduation varies by major. Course work in the major includes 18 credit units of practitioner core courses and 9 to 10 additional credits including the residency in the major.

*Required of All M.S.N. candidates.

Practitioner Core Courses (Required for all NP students)	Credits
N352. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N354. Managing Common Acute and Chronic Health Problems I	4
N355. Managing Common Acute and Chronic Health Problems II	4
N356. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N357. Selected Topics in Advanced Pathophysiology	3
Total	18

NURSE PRACTITIONER OPTIONS

Adult Nurse Practitioner-General Primary Care Major	Credits
Clinical Elective	3
Elective	3
N326. Nurse Practitioner Residency: Acute and Chronic Illness Management	3*
Total	9

Adult Nurse Practitioner-Oncology/HIV Major	Credits
N330. Oncology Nursing I: Epidemiology and Pathophysiology	3
N332. Oncology Nursing II: Symptom and Problem Management	3
N335. Nurse Practitioner Residency: Oncology	3*
Total	9

Acute Care Nurse Practitioner Major	Credits
N363. Management of Adult Critically Ill Patients	3
N364. Management of Acutely/Critically Ill Adult Neuroscience Patients	3
N365. Acute Care Nurse Practitioner Residency	3*
Total	9

Adult Nurse Practitioner-Cardiovascular	Credits
N327. Advanced Management of Patients with Cardiovascular Diseases	3
N328. Case Management of Patients with Selected Cardiovascular Illnesses	3
N326. Nurse Practitioner Residency: Acute and Chronic Illness Management	3
N329. Residency in Cardiovascular Advanced Practice Nursing	2
Total	11

Gerontological Nurse Practitioner Major	Credits
N370. Social Issues, Health, and Illness in the Aged Years	3
N376. Managing Care of the Frail Elderly	3
N375. Nurse Practitioner Residency: Gerontology	3*
Total	9

* All N.P. residency courses are variable credit, 1-4 credits.

Pediatric Nurse Practitioner Major	Credits
N384. Advanced Concepts in Development in Pediatric Nursing Practice	3
N385. Advanced Nursing Care of Children	3
N386. Nurse Practitioner Residency: Pediatrics	3*
Total	9

Family Nurse Practitioner Major	Credits
N392. Well Child Physical and Developmental Assessment for Family Nurse Practitioners	1
N393. Child Health in Family Care	3
N394. Sexual and Reproductive Health	3
N395. Family Nurse Practitioner Residency	4
Total	11

CLINICAL NURSE SPECIALIST MAJORS

The clinical nurse specialist majors focus on the knowledge and skills necessary to provide care to patients with complex health problems and their families, in a variety of settings. The total minimum number of credits required for graduation is 39. Course work in the majors includes 10 credit units in the clinical nurse specialist core courses and 9 to 14 credit units in the major. Elective credits are used to support the major.

Clinical Nurse Specialist Core Courses (Required for all CNS students)	Credits
N352. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N356. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N357. Selected Topics in Advanced Pathophysiology	3
Total	10

CLINICAL NURSE SPECIALIST OPTIONS

CNS—Gerontology Major	Credits
N370. Social Issues, Health, and Illness in the Aged Years	3
N354. Managing Common Acute and Chronic Health Problems I	4
N355. Managing Common Acute and Chronic Health Problems II	4
N376. Managing Care of the Frail Elderly	3
Total	14

CNS—Oncology Major	Credits
N330. Oncology Nursing I: Epidemiology and Pathophysiology	3
N332. Oncology Nursing II: Symptom and Problem Management	3
N334. Clinical Nurse Specialist Residency: Oncology	3
Electives/Independent Study	1-4
Total	10-13

* All N.P. residency courses are variable credit, 1-4 credits.

CNS—Pediatrics Major	Credits
N384. Advanced Concepts in Development in Pediatric Nursing Practice	3
N385. Advanced Nursing Care of Children	3
N383. Clinical Nurse Specialist Practicum: Pediatrics	3
Electives/Independent Study	1-4
Total	10-13

Course of Study for the Post-Master's Certificate

The purpose of the post-master's certificate program is to provide opportunities for students who already have an earned M.S.N. to gain specialized knowledge within a major provided at Duke University School of Nursing. The post-M.S.N. certificate represents the student's successful completion of the required courses in the chosen nursing major. Course requirements for the post-M.S.N. certificate are listed below by major.

NURSING SYSTEMS ADMINISTRATION	Credits
N340. Administration of Nursing Systems I	3
N344. Administration of Nursing Systems II	3
N345. Nursing Administration Residency	3-9
N348. Financial Management and Budget Planning	4
Total	13-19

INFORM.A.T.ICS OPTION	Credits
N347. Informatics Issues in Nursing Systems	2
N349. Nursing Informatics Theory and Application	3
N343. Nursing Informatics Residency	3-9
Total	8-14

ADULT

Adult Nurse Practitioner - General Primary Care	Credits
N352. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N354. Managing Common Acute and Chronic Health Problems I	4
N355. Managing Common Acute and Chronic Health Problems II	4
N356. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N326. Nurse Practitioner Residency: Acute and Chronic Illness Management	3
N357. Selected Topics in Advanced Pathophysiology	3
Clinical Elective	3
Elective	3
Total	24-27*

Acute Care Nurse Practitioner	Credits
N352. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N354. Managing Common Acute and Chronic Health Problems I	4

*If a candidate has an M.S.N. with a clinical major but desires the N.P. post-master's certificate in a different area, or if the candidate has an M.S.N. in administration, the two clinical courses (6 credits) in the new area will also be required.

N355. Managing Common Acute and Chronic Health Problems II	4
N356. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N357. Selected Topics in Advanced Pathophysiology	3
N363. Management of Adult Critically Ill Patients	3
N364. Management of Acutely/Critically Ill Adult Neuroscience Patients	3
N365. Acute Care Nurse Practitioner Residency	3
Total	27

Adult Nurse Practitioner-Cardiovascular	Credits
N352. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N354. Managing Common Acute and Chronic Health Problems I	4
N355. Managing Common Acute and Chronic Health Problems II	4
N356. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N357. Selected Topics in Advanced Pathophysiology	3
N326. Nurse Practitioner Residency: Acute and Chronic Illness Management	3
N327. Advanced Management of Patients with Cardiovascular Diseases	3
N328. Case Management of Patients with Selected Cardiovascular Illnesses	3
N329. Residency in Cardiovascular Advanced Nursing Practice	2
Total	29

ONCOLOGY NURSING

Clinical Nurse Specialist	Credits
N352. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N356. Clinical Pharmacology and Interventions	3
N330. Oncology Nursing I: Epidemiology and Pathophysiology	3
N332. Oncology Nursing II: Symptom and Problem Management	3
N334. Clinical Nurse Specialist Residency: Oncology	3
N357. Selected Topics in Advanced Pathophysiology	3
Total	19

Adult Nurse Practitioner-Oncology/HIV	Credits
N352. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N354. Managing Common Acute and Chronic Health Problems I	4
N355. Managing Common Acute and Chronic Health Problems II	4
N356. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N357. Selected Topics in Advanced Pathophysiology	3
N335. Nurse Practitioner Residency: Oncology	3
N330. Oncology Nursing I: Epidemiology and Pathophysiology	3

N332. Oncology Nursing II: Symptom and Problem Mangement	3
Total	21-27*

GERONTOLOGICAL NURSING

Clinical Nurse Specialist	Credits
N352. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N354. Managing Common Acute and Chronic Health Problems I	4
N355. Managing Common Acute and Chronic Health Problems II	4
N356. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N357. Selected Topics in Advanced Pathophysiology	3
N370. Social Issues, Health, and Illness in the Aged Years	3
N376. Managing Care of the Frail Elderly	3
Total	24

Nurse Practitioner	Credits
N352. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N354. Managing Common Acute and Chronic Health Problems I	4
N355. Managing Common Acute and Chronic Health Problems II	4
N356. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N357. Selected Topics in Advanced Pathophysiology	3
N370. Social Issues, Health, and Illness in the Aged Years	3
N376. Managing Care of the Frail Elderly	3
N375. Nurse Practitioner Residency: Gerontology	3
Total	21-27*

PEDIATRIC NURSING

Clinical Nurse Specialist	Credits
N352. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N356. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N357. Selected Topics in Advanced Pathophysiology	3
N384. Advanced Concepts in Development in Pediatric Nursing Practice	3
N385. Advanced Nursing Care of Children	3
N383. Clinical Nurse Specialist Practicum: Pediatrics	3
Total	19

Pediatric Nurse Practitioner	Credits
N352. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N354. Managing Common Acute and Chronic Health Problems I	4
N355. Managing Common Acute and Chronic Health Problems II	4
N356. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3

*If a candidate has an M.S.N. with a clinical major but desires the N.P. post-master's certificate in a different area, or if the candidate has an M.S.N. in administration, the two clinical courses (6 credits) in the new area will also be required.

N357. Selected Topics in Advanced Pathophysiology	3
N386. Nurse Practitioner Residency: Pediatrics	3
N384. Advanced Concepts in Development in Pediatric Nursing Practice	3
N385. Advanced Nursing Care of Children	3
Total	21-27*

FAMILY NURSING

Nurse Practitioner	Credits
N352. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice	4
N354. Managing Common Acute and Chronic Health Problems I	4
N355. Managing Common Acute and Chronic Health Problems II	4
N356. Clinical Pharmacology and Interventions for Advanced Nursing Practice	3
N357. Selected Topics in Advanced Pathophysiology	3
N392. Well Child Physical and Developmental Assessment for Family Nurse Practitioners	1
N393. Child Health in Family Care	3
N394. Sexual and Reproductive Health	3
N395. Family Nurse Practitioner Residency	4
Total	29

*If a candidate has an M.S.N. with a clinical major but desires the N.P. post-master's certificate in a different area, or if the candidate has an M.S.N. in administration, the two clinical courses (6 credits) in the new area will also be required.



Courses of Instruction

301. Theoretical Foundations of Advanced Nursing Practice. This course is designed to explore the theoretical bases for development of the advanced practice nurse and advanced practice. The focus will be the application of theoretical and conceptual frameworks to guide decision making for culturally diverse populations with a variety of problems to achieve desired outcomes. A variety of developmental, systems, psychodynamic, physiological, and nursing theories and conceptualizations relevant to health and illness care will be presented. Fall. 3 units. *Brundage, McIntire, and Wallsten*

302. Nursing Informatics. An introduction to computer technology in the health care arena with a focus on selected computer applications commonly used in the management of health care information. The automation of data management and its impact on nursing administration, education, practice, and research are addressed in the context of information systems and nursing informatics. Fall, spring. 2 units. *Hewitt*

303. Issues in Contemporary Health Care Organizations. Survey of key concepts that form the bases for understanding health care institutions and the environment in which they exist. Current issues affecting health care institutions within the context of the financial and political systems will be analyzed in relation to their impact on advanced nursing practice. Steps to prepare the advanced practice nurse to negotiate an independent contract will be introduced. Fall. 3 units. *Goodwin*

307. Research Methods. Focuses on research methods needed for systematic investigation and expansion of nursing knowledge. How to critically read research and develop a research proposal will also be studied. Fall, spring. 3 units. *Havens and Turner*

308. Applied Statistics. Emphasizes the application and interpretation of statistical procedures used in health care and nursing research. Data management and the relationship between research design and statistical techniques will also be studied. Spring. Prerequisite: Nursing 307 or consent of instructor. 2 units. *Champagne*

312. Research Utilization in Advanced Nursing Practice. The focus of this course is upon methods of implementing research findings to solve identified clinical problems. Students will obtain skill in developing research-based protocols and in using research methods to evaluate nursing care. Summer. Prerequisites: Nursing 307 and 308, or consent of instructor. 3 units. *Champagne, Havens, Turner, and Wallsten*

313. Thesis. 1 to 6 units. Fall, spring, summer. Variable credit. *Staff*

314. Nonthesis Option. 1 to 6 units. Fall, spring, summer. Variable credit. *Staff*

316. Scientific Writing. This course provides a review of the principles and practice of scientific writing, with emphasis on research proposals, theses, other scientific papers, and articles for publication. Students are expected to complete a proposal for a thesis or a nonthesis option, an article, or other scientific work as part of the course. Fall. 3 units. *Tornquist*

317. Women and Health. Explore selected health related topics of interest to women in their historic, cultural, and biologic contexts in a seminar format. Consent of instructor required. Spring. 3 units. *Brundage*

323. Foundations of Advanced Acute/Critical Care Nursing. Provides the information underpinning patient responses to common critical illnesses approached through an integration of physiologic, pathophysiologic, and other relevant theories. Course focuses on concepts and theories needed for skilled advanced nursing practice for patients and their families in acute and critical care settings. Topics include pulmonary,

neuroendocrine, renal, hepatic, and gastrointestinal problems and also trauma, multi-organ failure, and immunosuppression. Summer. Prerequisite: Nursing 357 or consent of instructor. 3 units. *Brundage*

325. Clinical Nurse Specialist Practicum: Acute/Critical Care Nursing. Provides the student with supervised practice as a clinical nurse specialist. Emphasis is upon the development of the domains and competencies of clinical nurse specialty practice within acute care settings. Students specialize in nursing care of selected patient populations. Fall, spring, summer. Prerequisites: Nursing 323, 352, 356, and 357. 3 units. *Brundage and Hawthorne*

326. Nurse Practitioner Residency: Acute and Chronic Illness Management. Provides the student with supervised practice as a nurse practitioner. Emphasis is upon the development of the domains and competencies of nurse practitioner practice in both acute and primary care settings. Activities also emphasize the management of major acute and chronic illnesses. 1 to 4 units. Fall, spring, summer. Prerequisites: Nursing 323, 352, 354, 355, 356, and 357. Variable credit. *Hawthorne and Wilkman*

327. Advanced Management of Patients with Cardiovascular Diseases. This course focuses on indepth pathophysiology and management of patients with major cardiovascular disorders. Content includes diagnostic and treatment options, recovery of patients following major cardiac events, symptom management during chronic illness, and prevention of disease. Students will also obtain skill in ECG interpretation and cardiac physical exam. Prerequisites: Nursing 352 and 357. 3 units. *Hawthorne*

328. Care Management of Patients with Selected Cardiovascular Illnesses. The focus of this course is to provide the student with supervised experience in care management of adult patients with selected cardiovascular illnesses in a variety of clinical settings. The student will incorporate the knowledge and critical thinking skills developed in Nursing 327 into actual patient evaluations and care management. Weekly seminars will focus upon group discussion of paradigm cases from clinical practice. The seminar will also provide the student with opportunity for formal experience in case presentations. Prerequisites: Nursing 327, 352, 354, 355, 356, and 357. 3 units. *Hawthorne*

329. Residency in Cardiovascular Advanced Practice Nursing. This course provides the student with supervised practice as a nurse practitioner. Emphasis is upon synthesis of knowledge and role development through the domains and competencies of nurse practitioner practice in the care of cardiovascular patients. Clinical experiences focus on the management of common acute and chronic illness through transitions in care. Prerequisites: Nursing 327, 328, 352, 354, 355, 356, and 357. Variable credit. *Hawthorne*

330. Oncology Nursing I: Epidemiology and Pathophysiology. Focus is on the epidemiology, pathophysiology, and biobehavioral aspects of cancer across the adult years. Major topics include cancer physiology, prevention, detection, role of defenses, treatment, and responses to cancer. Spring. 3 units. *McIntire*

332. Oncology Nursing II: Symptom and Problem Management. The ONS Guidelines for Oncology Nursing Practice serve as the framework for examination of potential problems and symptom management in cancer patients. Topics include knowledge deficit, information, coping, comfort, nutrition, protective mechanisms, mobility, elimination, sexuality, ventilation, circulation, and managed care. Case management and case studies are used in seminars. Summer. Prerequisite: Nursing 330. 3 units. *McIntire*

334. Clinical Nurse Specialist Residency: Oncology. A clinical practicum in which students specialize in their interest areas, choosing among ambulatory/clinic care, inpatient care, bone marrow transplant care, community/preventive care, home care, hospice care, and care of persons with HIV and AIDS. Case management, care maps,

case studies, and ONS Guidelines for Oncology Nursing Practice serve as formats for the practicum and seminars. Fall, spring, summer. Prerequisites: Nursing 330, 332, 352, 356, and 357. 3 units. *McIntire*

335. Adult Nurse Practitioner Residency: Oncology. A clinical residency in which students specialize in the domains and competencies of the adult practitioner in oncology nursing. The areas include: managing patient health illness in ambulatory and acute inpatient settings, monitoring quality care, organizational and role competencies, healing and teaching roles. 1 to 4 units. Fall, spring, summer. Prerequisites: Nursing 330, 332, 352, 354, 355, 356, and 357. Variable credit. *McIntire*

340. Administration of Nursing Systems I. Focuses on the theoretical bases for developing and maintaining nursing systems in health care/health related institutions. Development of management skill serves as the basis for further inquiry and development of the nurse administrator role. Problem solving methodology is used to develop strategies for dealing with issues from the internal and external environment of health care institutions. Fall. 3 units. *Havens*

343. Nursing Informatics Residency. This course is designed to build the student's prior knowledge and experience in nursing informatics within a context of advanced nursing practice. The intent of the residency will be to develop independent problem solving skills in the synthesis of advanced practice nursing knowledge and informatics knowledge and skills under the guidance and mentorship of a practicing informatics specialist (preceptor). The student's learning project and experiences will be supervised by the preceptor and professor. Consent of instructor required. 3 to 9 units. Prerequisites: Nursing 347 and 349. Variable credit. *Goodwin*

344. Administration of Nursing Systems II. Focuses on the theoretical bases of leadership in facilitating the development of professional nursing practice. Development, maintenance, and supervision of nursing systems in health care/health related institutions are discussed. Regulation and legal tenets from the external environment and their impact on the administration of nursing systems are emphasized. Spring. Prerequisite: Nursing 340. 3 units. *Havens*

345. Nursing Administration Residency. The residency builds upon students' prior knowledge and experience in nursing administration. The intent is to develop independent problem solving skills while under the guidance and mentorship of a practicing nurse administrator. The minimum required credits are three with a maximum of nine credits for those needing additional learning experiences with a preceptor. 3 to 9 units. Summer. Prerequisites: Nursing 340 and 344. Variable credit. *Havens*

346. Entrepreneurial Ventures in Nursing. This course examines the development and maintenance of entrepreneurial (intrapreneurial) ventures in the health care field. Special attention will be devoted to the identification of innovative services, and establishing, marketing, financing, and maintaining the venture. Students will be exposed to the experiences of established entrepreneurs and advisors in the field. The influence of the political, economic, legal, and social environment on the entrepreneurial venture will be examined. Summer. 3 units. *Staff*

347. Informatics Issues in Nursing Systems. This course is focused on the developing field called "nursing informatics" which combines nursing science, computer science, and information/decision science, and examines related issues of applying nursing informatics within complex health care organizations and administrative structures. Research, ethical, social, cultural, economic, privacy/confidentiality, and legal issues are among the many issues discussed. Students will master novice problem solving skills related to selected issues. Spring. Prerequisites: Nursing 302 and 303. 2 units. *Goodwin*

348. Financial Management and Budget Planning. Designed for managers in complex organizations. Focuses on the knowledge and skills needed by the nurse manager to plan, monitor, and evaluate budget and fiscal affairs for a defined unit or clinical division. Health care economics, personnel, and patient activities are analyzed from a budgetary and financial management perspective within an environment of regulations and market competition. Spring. Prerequisite: Nursing 303 suggested. 4 units. *Zelman*

349. Nursing Informatics Theory and Application. This course is focused on the developing field called "nursing informatics" which combines nursing science, computer science, and information/decision science, and examines both theoretical and practical application considerations that impact nursing. Learning experiences are structured to provide the student with an opportunity to develop both theoretical knowledge and enhanced technology skills through laboratory application of didactic content and a real world project involving systems analysis, information specification, and project management as a part of the class. Summer. Prerequisites: Nursing 302, 303, and 347. 3 units. *Goodwin*

352. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice. Combines lecture and laboratory experiences to develop advanced skills in assessment of physical, cognitive, nutritional, and functional domains. Nurse-patient interaction, data collection, and diagnostic reasoning are emphasized. Consent of instructor required. Fall. 4 units. *Hawthorne, Lorimer, Ouimette, and Wilkman*

354. Managing Common Acute and Chronic Health Problems I. The course emphasizes assisting patients to reach or maintain their highest level of health and functioning. The focus will be on health promotion, health maintenance, and primary care management of respiratory, cardiac, gastrointestinal, and mental health problems encountered by patients and their families. The pharmacological management of common problems is systematically integrated into the course. Clinical practicums are in a variety of settings. Practice settings include rural health clinics, home, hospital units, and long-term care facilities. Advanced practice role development is incorporated into the course through care management seminars and supervised clinical practice. Spring. Prerequisite: Nursing 352; prerequisite/concurrent: Nursing 356. 4 units. *Blood-Siegfried, Friedman, Lorimer, Ouimette, Price, and Wilkman*

355. Managing Common Acute and Chronic Health Problems II. The course emphasizes assisting patients to reach or maintain their highest level of health and functioning. The focus will be on health promotion, health maintenance, and primary care management of common skin disorders, arthritic, neurologic, gynecologic, anemia, and endocrine problems encountered by patients and their families. The pharmacological management of common problems is systematically integrated into the course. Clinical practicums are in a variety of settings. Practice settings include rural health clinics, home, hospital units, and long-term care facilities. Advanced practice role development is incorporated into the course through care management seminars and supervised clinical practice. Summer. Prerequisites: Nursing 352 and 356. 4 units. *Blood-Siegfried, Denman, Lorimer, Ouimette, and Wilkman*

356. Clinical Pharmacology and Interventions for Advanced Nursing Practice. The course is a combination of lecture and case analyses designed to increase assessment and management skills related to pharmacological management of patients with a variety of common acute and chronic health problems. Data collection and diagnostic reasoning are emphasized in relation to drug selection, patient/family education, monitoring, and evaluation of pharmacological interventions. Spring. 3 units. *Brundage and Kessler*

357. Selected Topics in Advanced Pathophysiology. The course focuses on developing an advanced pathophysiological knowledge foundation to understand alterations in biological processes that affect the body's dynamic equilibrium or homeostasis. This foundation assists the student in physical assessment and clinical reasoning to differentiate normal from abnormal physiological function and to consider causality for understanding underlying pathophysiological alterations in illness for the management of patients in advanced clinical practice. Topics selected will provide the basis for understanding pathophysiology of common health problems and complex physiological alterations encountered in advanced clinical practice. Fall. 3 units. *Staff*

358. Advanced Physiology. Focuses on developing an advanced knowledge base to understand normal human physiological phenomena. Summer. Prerequisite: Bachelor of Science in Nursing or Bachelor of Science in related area. 3 units. *Staff*

359. Management of Diabetes Mellitus in a Primary Care Setting. The course is designed to develop in-depth knowledge of the management of diabetes and related disorders. This knowledge will provide the scientific foundation for clinical decision making. The clinical practice component is designed to assist the student to increase skill in diagnosis and management of diabetes and related disorders. Prerequisite: Nursing 352, 354, 356, 357, or consent of instructor. 3 units. *Wilkman*

360. Concepts of Teaching and Learning. Focuses on the key concepts and principles that form the bases for the teaching and learning process. Educational theories of teaching and learning, situations and issues serve as the framework for developing instructional strategies used in advanced nursing practice roles. Spring. 3 units. *McIntire*

362. Ethics in Nursing. Focuses on the historical development of ethics in nursing, analysis of moral language, codes of ethics, frameworks for ethical decision making with case analysis, and strategies for discussion of ethics in nursing. Summer. 3 units. *Staff*

363. Management of Adult Critically Ill Patients. Focuses on pathophysiological mechanisms, clinical decision making, and treatment modalities for managing common problems seen in critically ill patients. Integration of technological aspects of care is emphasized in both the didactic and clinical components of the course. Consent of instructor required. Prerequisites: Nursing 352, 354, 355, 356, and 357. 3 units. *Staff*

364. Management of Acutely/Critically Ill Adult Neuroscience Patients. Focuses on pathophysiological mechanisms, clinical decision making, and treatment modalities for the management of health problems seen in acutely/critically ill neuroscience patients. Consent of instructor required. Spring. Prerequisites: Nursing 352, 354, 355, 356, 357, and 363. 3 units. *Staff*

365. Acute Care Nurse Practitioner Residency. Focuses on synthesis of theory and implementation of the acute care nurse practitioner role within a collaborative model of practice with patients in acute and critical care settings. Consent of instructor required. 1 to 4 units. Fall, spring, summer. Prerequisites: Nursing 352, 354, 355, 356, 357, 363, and 364. Variable credit. *Staff*

370. Social Issues, Health, and Illness in the Aged Years. Examines diversity in development and adaptation to environmental, social, psychological, and biological changes. Theories of aging, health and aging, intimacy and sexuality, rural-urban health care patterns, minority health care patterns, demographic trends, and death, dying, and loss are discussed. Spring. 3 units. *Wallsten*

375. Nurse Practitioner Residency: Gerontology. The residency provides GNP students with concentrated clinical opportunities. Emphasis is on clinical decision making, practice issues, and organizational management. Residency sites and associ-

ated preceptors are arranged by faculty. 1 to 4 units. Fall, spring, summer. Prerequisites: Nursing 352, 354, 355, 356, 357, 370, and 376. Variable credit. *Ouimette and Wallsten*

376. Managing Care of the Frail Elderly. Emphasizes assessment, rehabilitation, and management of complex problems of elders who reside in community and institutional settings. Research projects and innovative care strategies are explored. Organizational and managerial effectiveness and consultative roles of the GNP/GCNS are examined. Fall. Prerequisites: Nursing 352, 354, 355, 356, and 357. 3 units. *Ouimette and Wallsten*

383. Clinical Nurse Specialist Practicum: Pediatrics. Supervised clinical practicum exploring the role of the clinical nurse specialist in a pediatric setting of the student's choice. Fall, spring, summer. Prerequisites: Nursing 352, 356, 357, 384, and 385. 3 units. *Blood-Siegfried and Lorimer*

384. Advanced Concepts in Development in Pediatric Nursing Practice. Focuses on the importance of developmental issues in the advanced practice of pediatric nursing. Normal cognitive, motoric, social/emotional, and language development and the usual developmental challenges of each age group are addressed in the context of health maintenance and management of illness. Spring. Prerequisite: Nursing 352. 3 units. *Blood-Siegfried and Lorimer*

385. Advanced Nursing Care of Children. This course addresses societal and family issues that impact on the maintenance of health in children and on complex care management by the advanced pediatric nurse practitioner. Summer. Prerequisites: Nursing 352 and 384. 3 units. *Blood-Siegfried and Lorimer*

386. Nurse Practitioner Residency: Pediatrics. Supervised clinical practice in an approved setting which allows the opportunity for practice as a pediatric nurse practitioner. 1 to 4 units. Fall, spring, summer. Prerequisites: Nursing 352, 354, 355, 356, 357, 384, and 385. Variable credit. *Blood-Siegfried, Friedman, and Lorimer*

392. Well Child Physical and Developmental Assessment for Family Nurse Practitioners. The course focuses on the physical and developmental assessment of well children from infancy through adolescence. It is a combined lecture and laboratory experience designed to increase assessment skills needed in the care of children. The laboratory portion of the course takes place in the School of Nursing skills lab and the newborn nursery. Developmental evaluation centers, schools, and daycare centers will also be settings. Prerequisites: Nursing 352, 354, 356, and 357, and 355 (concurrent) 1 unit. *Friedman or Messick*

393. Child Health in Family Care. This course focuses on children from infancy to adolescence within the contextual frameworks of family, school, and community. It addresses growth and development, health maintenance, and anticipatory guidance needs of various age groups. The role of the family nurse practitioner in the management of common health problems of children is included. The clinical practice component of the course will be in primary care settings that serve children; public health departments, school-based clinics, public and private family and pediatric practice sites, rural health clinics, and developmental evaluation centers. Prerequisites: Nursing 352, 354, 355, 356, and 357. 3 units. *Denman and Friedman*

394. Sexual and Reproductive Health. Course focuses on women and men from adolescence through old age within the context of their sexual and reproductive development. Addresses issues related to development, family, and health maintenance, as well as common sexual and reproductive health problems of various age groups. The role of the family nurse practitioner in the management of preconceptual, prenatal, and postnatal care of women and their families is included. The clinical practice component of the course will be in primary care settings that serve women and men at different

points in the sexual and reproductive continuum. Prerequisites: Nursing 352, 354, 355, 356, and 357; current BCLS including Heimlich maneuver. 3 units. *Friedman and Price*

395. Family Nurse Practitioner Residency. This residency occurs in a clinical setting with the student having the mentorship of either a nurse practitioner or primary care physician. Seminars are conducted to allow the student to synthesize learning from clinical applications of advanced practice. The student is expected to perform health assessments, order and interpret diagnostic tests, determine a plan of care for family members, collaborate with the health team, and refer patients to other health care providers when appropriate. 1 to 4 units. Fall, spring, summer. Prerequisites: Nursing 352, 354, 355, 356, 357, 393, and 394. Variable credit. *Friedman*

399. Selected Topics or Independent Study. Students select a topic of professional interest within the specialty area or in support of the specialty area, to be studied with a faculty member. Specific objectives, evaluation method, and other requirements are determined prior to registering for the course of study. Consent of instructor required. 1 to 3 units. Fall, spring, summer. Prerequisite: matriculation into nursing curriculum. Variable credit. *Staff*





The Allied Health Programs



The Allied Health Programs

There are several health-service related educational programs offered through the Division of Allied Health of the Duke University Medical Center that are neither medicine nor nursing. Currently, the Allied Health Division is comprised of four master's degree programs and several certificate programs. Every effort is made to keep each of these Allied Health programs closely related to the Medical School departments whose fields they serve. Today, there are approximately 231 students enrolled in such programs at Duke University. In addition, the School of Medicine is affiliated with one master's level program that is administered through the Graduate School.

Resources for Study

All of the study facilities available to medical students are available to allied health students. See descriptions for Library/Communications Center, the Thomas D. Kinney Central Teaching Laboratory and Division of Audiovisual Education which may be found in a foregoing portion of this bulletin.

Several of the allied health programs have affiliations with other hospitals and medical institutions for clinical instruction.

Student Life

Living Accommodations. Because of the shortage of residential space, students enrolled in allied health certificate programs are not eligible for student housing. Student's enrolled in the Master's Programs, however, are eligible. The Department of Housing Management maintains a listing of rental apartments, rooms and houses provided by property owners or real estate agencies in Durham. These listings are available in the department only; during the summer an assistant is available to answer questions and aid students in their attempt to obtain housing off campus. Information

on commercial complexes in the Durham area may be obtained by writing to the Off-Campus Housing Office, 217 Anderson Street, Durham, NC 27705. Except for assuring that owners sign a statement of nondiscrimination, off-campus property is in no way verified and neither the university nor its agents negotiate between owners and interested parties. The search for accommodations should begin as soon as possible after acceptance. A visit of two or three days allows you the opportunity to make use of the off-campus service and to inspect personally the availabilities.

Dining Facilities. Duke Dining Services operates a variety of dining facilities including cafeterias, snack bars, restaurants, salad bars, and more. Students may make food purchases in dining establishments with cash, or they may choose to open a pre-paid account. Information about dining plan accounts and flexible spending accounts is available from the DukeCard Office, 024 Union West, Box 90911, Durham, North Carolina 27708-0911, 919/684-5800.

Cafeterias operated by the hospital are available both in the Medical Center and the Veterans Administration Medical Center.

Student Financial Aid. Duke University recognizes the responsibility of students and their families to provide funds according to their ability to achieve the educational objective. Students are encouraged to pursue every available source of support through their local and state student assistance programs.

All programs are approved for veterans education benefits for those who are eligible. Some of the programs have limited student support available through stipends or special scholarships.

Financial aid is available through Duke in limited amounts in the form of loans. When all institutional funds are pooled, the amount available to a totally needy student is inadequate to meet the school's recognized costs. A Free Application for Federal Student Aid (F.A.F.S.A.) is required in addition to the Duke University Financial Aid Application. A copy of the student's (and spouse's, if applicable) federal income tax return for the previous taxable year is required. In the case of the dependent student, a copy of the parent's federal income tax return for the last taxable year is also required. Duke University reserves the right to decline to approve loan applications for those applicants who do not have a satisfactory credit history. U.S. citizenship or permanent residence visa is required of all students receiving loans through the school.

It is the responsibility of financial aid recipients to keep the Medical Center Office of Financial Aid informed of any outside financial assistance they may receive. It must be understood that Duke reserves the right to reconsider its offer of financial assistance in the event of a major outside award to a recipient. No financial aid funds may be used during a period when the recipient is not involved with work toward the degree or certificate. Less than half-time or special students are not eligible for financial aid.

Students who have been accepted for matriculation routinely receive financial aid applications. Annual reapplication is required of all financial aid recipients.

Federal Pell Grant is a federally funded grant for students with financial need who have not earned a baccalaureate degree and are enrolled in any postsecondary educational program. To apply, the applicant completes a Free Application for Federal Student Aid (F.A.F.S.A.) which may be obtained from a high school guidance counselor or any financial aid office.

Federal Stafford Student Loans (see description on page 62).

North Carolina Student Incentive Grant (N.C.S.I.G.) is available to residents of North Carolina who are enrolled in any postsecondary educational program in North Carolina. The applicant must demonstrate substantial financial need and must not have earned a baccalaureate degree. Application deadline is March 1st for the following academic year. To apply the applicant completes a Free Application for Federal Student Aid (F.A.F.S.A.) requesting that the information be sent to College Foundation, Inc., P.O. Box 12100, Raleigh,

North Carolina 27605-2100. FAFSAs may be obtained from a high school guidance counselor or any financial aid office.

North Carolina Student Loan Program for Health, Science, and Mathematics. These loans provide financial assistance to North Carolina residents who demonstrate need as determined by the board. Loans are available for study in the medical fields, mathematics, and science programs that lead to a degree. The applicant must be a domiciliary of North Carolina and accepted as a full-time student in an accredited associate, baccalaureate, master's, or doctoral program leading to a degree. Loan recipients in professional or allied health programs may cancel their loans through approved service in shortage areas, public institutions, or private practice. Medical students may receive up to \$8,500 per year for each of the four years; master's degree students are eligible for two loans of up to \$6,500 each; bachelor's degree students are eligible for three loans of up to \$5,000 each. For application forms and more information write: Executive Secretary, Board for Need-Based Student Loans, P.O. Box 20549, Raleigh, North Carolina 27619-0549, or telephone (919) 571-4178.

Every effort is made to assist the student with tuition and living expenses within the framework of school policies which may be in effect at the time. However, as funds are limited, prior indebtedness is not given favorable consideration as part of the student's budget. Any applicant having further questions may write to Office of Financial Aid, 126 Davison Building, Box 3067 DUMC, Durham, North Carolina 27710.

Student Health Service. Student health service, health insurance, and counseling and psychological services, fully described in an earlier portion of this bulletin, are available to all allied health students.

Judicial System and Regulations. Duke University expects and requires of all its students full cooperation in developing and maintaining high standards of scholarship and conduct. Each student is subject to the rules and regulations of the university which are currently in effect or which are, from time to time, put into effect by the appropriate authorities of the university. At the same time, the individual is responsible for decisions and choices within the framework of the regulations of the community as Duke does not assume *in loco parentis* relationships.

Any student, in accepting admission, indicates a willingness to subscribe to and be governed by these rules and regulations and acknowledges the right of the university to take such disciplinary action, including suspension or expulsion, for failure to abide by these regulations or for other conduct adjudged unsatisfactory or detrimental to the university. A copy of the Allied Health Judicial System including a code of ethics, rules of conduct, and judicial procedures is provided each student.

Fees for Transcripts. Requests for transcripts of academic records should be directed to the Office of the Medical Center Registrar. A fee of three dollars, payable in advance, is charged for each copy. However, the transcript fee is waived for financially needy students who require transcripts to apply for external funding.

Student Health Fee. All regular full-time students and part-time degree candidates are required to pay a health fee that is nonrefundable after the first day of classes in the semester. The student health fee entitles the student to outpatient treatment through the Student Health Service, inpatient treatment in the Infirmary, and use of Counseling and Psychological Services. The health fee is not to be confused with the Duke Student Accident and Hospitalization Insurance (the premium for this insurance is minimized due to the existence of the Student Health Services) which covers a large number of medical costs above and beyond the treatment available through the Student Health Services. The identification of a separate student health fee in no way changes the policy concerning the additional Student Accident and Hos-

pitalization Insurance Plan. Student Health brochures are available in the bursar's office and in the Student Health Service Clinic.

Student Accident and Hospitalization Insurance. At the beginning of each fall semester, medical and allied health students must provide proof to the bursar's office of coverage under an accident and hospitalization insurance policy or purchase the Duke Student Accident and Hospitalization Insurance policy. If hospital services outside of the Student Health Service are needed, this insurance policy provides protection twenty-four hours per day during the twelve-month term of the policy of each student insured. Students are covered on and off the campus, at home, while traveling between home and school, and during interim vacation periods.

Refunds*

If a student withdraws, tuition is refunded according to the following schedule:

Withdrawal from Master's Programs	
Before classes begin	Refund full amount
During first or second week	80 %
During third to fifth week	60 %
During sixth week	20 %
After sixth week	None
Withdrawal from Certificate Programs Refund+	
Before classes begin	full amount
During first week	80 %
After first week of classes	None

*The Biometry Training Program observes an alternate refund policy as noted in the Biometry section under "Withdrawal from a Course."

+Includes involuntary withdrawal for academic reasons.



The Master of Health Sciences in Biometry

THE BIOMETRY TRAINING PROGRAM

Program Director: William E. Wilkinson, Ph.D.

This training program meets an existing need at Duke University Medical Center for formalized academic training in the quantitative and methodological principles of clinical investigation. Designed primarily for Duke clinical fellows who are training for academic careers, the program offers formal courses in biostatistics, research design, decision analysis, and the use of computers for processing and analyzing medical data. Students who complete a prescribed course of study in the training program are awarded a Master of Health Sciences in Biometry degree by the School of Medicine.

The Biometry Training Program is offered by the faculty of the Division of Biometry in the Department of Community and Family Medicine with the participation of other members of the Medical Center faculty having expertise in relevant areas.

Degree and Nondegree Admission. All persons wishing to take courses in the Biometry Training Program, even on a nondegree basis, must be admitted to the program or be currently enrolled in a graduate degree-granting program at Duke. A bachelor's degree (or the equivalent) from an accredited institution is a prerequisite for admission either as a degree candidate or as a nondegree student.

A student seeking admission to the Biometry Training Program should obtain an application packet which contains the necessary forms and detailed instructions on how to apply. Requests for application forms or for additional information about the training program should be directed to the Biometry Training Program, Box 3827, Duke University Medical Center, Durham, North Carolina 27710, (919) 681-4560.

A complete application for nondegree admission requires only the application form and an official transcript from each post-secondary institution attended. Applicants with an M.D., Ph.D., or equivalent degree who are currently medical residents, fellows, or faculty members at Duke are not required to submit transcripts for nondegree admission.

A complete application for admission as a degree candidate consists of the application form and the following supporting documents: (1) an official transcript from each post-secondary institution attended; (2) three letters of evaluation written by persons qualified to testify to the applicant's capacity for graduate work; (3) official scores on the Graduate Record Examination General (Aptitude) Test. (G.R.E. scores are not required for applicants having an M.D., Ph.D., or equivalent degree.)

In the event that a nondegree student is subsequently admitted as a degree candidate, relevant course work is accepted for degree credit.

Program of Study. The degree requires 24 units of graded course work and a research and thesis project for which six units of credit are given. Four courses constituting 12 units are required for all degree candidates: 211, 212, 222 and 224 (see Courses of Instruction below). The student's clinical research activities provide the setting and the data for the project; the thesis serves to demonstrate the student's competence in the use of quantitative methods in medical research.

The program is designed for part-time study, allowing the fellow/student to integrate the program's academic program with his or her clinical training. The ten-month academic year consists of three terms: a sixteen-week fall term, a twelve-week spring term beginning in January and a twelve-week summer term beginning around April 15. (The exact dates are determined by the Medical School's calendar for fourth year medical students.)

Examining Committee. The faculty member who directs the student's research project and two other faculty members constitute an examining committee to certify that the student has successfully completed this degree requirement. The chairperson and at least one other member of this committee must have an appointment in the Division of Biometry; the constitution of each examining committee must be approved by the program director.

Grades. Grades in the Biometry Training Program consist of *H* (High Pass), *P* (Pass), *L* (Low Pass) and *F* (Fail). In addition, an *I* (Incomplete) indicates that some portion of the student's work is lacking for a reason acceptable to the instructor at the time grades are reported. The instructor who gives an Incomplete for a course may specify a date by which the student must make up the deficiency. In exceptional circumstances, an Incomplete that is not resolved within one calendar year from the date the course ended may be extended for one additional year with the written approval of the course instructor and the program director. If an Incomplete is not resolved within the approved period, the grade of *I* becomes permanent and may not be removed from the student's record.

A student's enrollment as a degree candidate is terminated if he or she receives a single grade of *F* or two grades of *L* in the program. For these purposes, *WF* (see below) and a permanent *I* are both considered to be failing grades.

Withdrawal from a Course. A course may be dropped at the student's discretion during the first three weeks of class; no grade is recorded and all tuition is refunded. If a course is dropped later in the term, no tuition is refunded and the status of the student at the time of withdrawal is indicated on the permanent record as *WP* (Withdrew Passing) or *WF* (Withdrew Failing).

Tuition. Tuition for the 1997-98 academic year is \$425 per unit. Faculty members and some fellows may be eligible for the university's Educational Assistance Program. Other sources of support exist in some clinical departments; prospective students should consult with program directors and division chiefs regarding potential funding sources.

Transfer of Credit. Transfer of credit for graduate work completed at another institution is considered only after a student has earned a minimum of 12 units in the Biometry Training Program. A maximum of 6 units of credit may be transferred for graduate courses completed at other institutions. Such units are transferred only if the student received a grade of *B* (or its equivalent) or better. The transfer of graduate credit does not reduce the required minimum registration of 30 units for the degree. However, a student who is granted such transfer of credit may be permitted to register for as much as 12 units of thesis research instead of the usual 6 units.

Time Limitations. A degree candidate is expected to complete all requirements within six calendar years of matriculation. Degree credit for a course (including one for which transfer credit is given) expires six years after the course is completed by the student; in this case, degree credit can be obtained only by retaking the course.

Courses of Instruction

BTP-211. Probability and Statistical Inference. Laws of probability, probability distributions, descriptive statistics, graphical displays of relationships, philosophy of statistical tests, tests for differences in central tendency, paired comparisons, and correlation. Parametric and nonparametric procedures. Simple linear regression and one-way analysis of variance. 4 units.

BTP-212. Design of Etiologic and Clinical Studies. General principles of study design for clinical research. Topics include: observation studies (descriptive, case-control, and cohort) with their relative advantages and statistical methods used in their

analysis; clinical trials. Epidemiologic measures, health status measures, and ethical considerations are discussed. Prerequisite: BTP-211. 3 units.

BTP-217. Clinical Decision Analysis. Using formal methods for analyzing complex patient management problems. Structuring problems as trees. Applying data from the literature to estimate the likelihood of outcomes. Quantitating the value of health outcomes. Calculating the strength of preference for one strategy over others. Decision analysis as a guide to clinical research and as a policy tool. Prerequisite: BTP-211. 3 units.

BTP-222. Statistical Programming in SAS. Creating, manipulating, and analyzing research data using SAS. Prerequisites: BTP-211 (may be taken concurrently) and experience with PC-DOS. 2 units.

BTP-224. Regression Models. Formulation of linear regression models and definition of model parameters in the context of multivariable regression, analysis of variance, and analysis of covariance. Techniques for graphically checking model assumptions and testing lack of fit. Model validation, the effect of modeling too many variables, and methods for reducing the number of variables to model. Introduction to the logistic and Cox proportion hazards regression models. Prerequisites: BTP-211 and BPT-222. 3 units.

BTP-225. Statistical Graphics. A practical theory of presentation and exploratory graphics, accompanied by numerous examples of both poor and excellent graphics. Graphical techniques include: quantile plots, plots of transformations and of cumulative frequency distributions, box plots, histograms, stem-and-leaf diagrams, dot charts, scatterplots, jittering, smoothing, coplots, scatterplot matrices, and multiway dot charts. Prerequisite: BTP-222. 1.5 units.

BTP-226. Categorical Data Analysis. Methods for analyzing nominal and ordinal response variables, including chi-square tests of independence and homogeneity, Mantel-Haenszel tests, logistic regression models, and weighted least squares fitting of linear models. Measures of association such as Kendall's tau, Spearman's rho, the relative risk, and the odds ratio. Prerequisite: BTP-224. 2 units.

BTP-227. Nonparametric Statistical Analysis. General methods for analyzing non-normally distributed data. Specific topics include testing of goodness of fit, inferences concerning location and scale in one and two sample problems, general distribution tests for two or more independent samples, and association analysis. Prerequisite: BTP-211. 2 units.

BTP-228. Survival Analysis. General aspects of time-to-event analysis, including basic concepts such as censoring and event times. Construction of actuarial and Kaplan-Meier survival curves. Testing for equivalence of survival distributions. Parametric and Cox regression modeling. Assessment of relative hazards and proportional hazards assumption. Laboratory exercises involving analysis of clinical and epidemiologic follow-up data. Prerequisite: BTP-226. 2 units.

BTP-231. Clinical Trials. Fundamental concepts in the design and analysis of clinical trials. Topics include protocol management, sample size calculations, determination of study duration, randomization procedures, multiple endpoints, study monitoring and early termination. Prerequisite: BTP-228. 3 units.

BTP-233. Clinical Research Seminar. This seminar integrates and builds on the core courses (211, 212, and 224) to provide practical experience developing and critiquing the methodological aspects of clinical research protocols. Prerequisite: BTP-224. 2 units.

BTP-234. Clinical Research Seminar. This seminar is a continuation of BTP 233. Prerequisite: BTP-233. 1.5 units.

BTP-235. Analysis of Genetic Data. An introduction to the use of statistics for genetic data with a focus on human genetics. Topics covered include: genetic variation, heritability, Hardy-Weinberg equilibrium, linkage analysis, mapping genes, and DNA fingerprinting. Specific student interests are considered if time permits. Prerequisite: BTP-211. 3 units.

BTP-236. Psychometrics and Reliability. This course presents those elements of psychometric theory that are relevant to the conduct of clinical research. Issues in reliability and validity are addressed. The definitions and use of intraclass correlation, classical test theory, and generalizability theory as models of reliability are presented. Questionnaire design and scale construction are covered as well as methods for assessing the psychometric properties of scales, such as factor analysis and Cronbach's alpha. The use of reliability in sample size estimation is covered. Prerequisites: BTP-212 and BTP-224. 1.5 units.

The Pathologists' Assistant Program

MASTER OF HEALTH SCIENCES CURRICULUM

Pathologists' Assistant Program Core Faculty

Professor and Chairman, Department of Pathology: Salvatore V. Pizzo, M.D., Ph.D.

Director, Pathologists' Assistant Program and Assistant Professor: James G. Lewis, Ph.D.

Medical Director, Pathologists' Assistant Program, Director of the Autopsy Service and Associate Professor: Alan D. Proia, M.D., Ph.D.

Medical Director for Surgical Pathology Assistant and Assistant Professor: Marcia Gottfried, M.D.

Director of Surgical Pathology and Associate Professor: Lester Layfield, M.D.

Surgical Pathology Training Coordinator: Pamela Vollmer, B.H.S.

Director, Autopsy Service, Veterans Affairs Medical Center and Assistant Clinical Professor: Jane Gaede, M.D.

Director of Surgical Pathology, Veterans Affairs Medical Center and Assistant Clinical Professor: Robin Vollmer, M.D.

Chief, Pediatric Pathology and Professor: William D. Bradford, M.D.

Attending Pathologists

Professors: Edward Bossen, M.D.; Robert Jennings, M.D.; Keith Reimer, M.D., Ph.D.; Stanley Robboy, M.D.; John Shelburne, M.D., Ph.D.; Joachim Sommer, M.D.

Associate Professors: Victor Roggli, M.D.; Peter Zwadyk, Ph.D.

Assistant Professors: Marcia Gottfried, M.D.; David Howell, M.D., Ph.D.; Christine Hulette, M.D.; Roger McLendon, M.D.; Howard Ratech, M.D.; Charles Steenbergen, M.D., Ph.D.

Program of Study. This is a twenty-four month program beginning with the start of the medical school academic year in August of each year. It provides a broad, graduate level background in medical sciences in support of intensive training in anatomic pathology. With the background in anatomy, histology, physiology, and microbiology, the students learn pathology at the molecular level in the classroom and are trained and given experience in the microscopic and gross morphology of disease in close one-on-one training with pathology department faculty. They learn dissection techniques and all technical aspects of anatomic pathology in summer rotations. The curriculum is designed to produce individuals who fill the gap between the pathologist on the autopsy and surgical pathology services and other technical personnel who work in the tissue processing laboratory.

Certification. The curriculum, faculty, facilities, and administration of the program are approved by the national governing body of pathologists' assistants, the American Association of Pathologists' Assistants (A.A.P.A.). Graduates are able to sit for the A.A.P.A. national certification examination.

Degree Requirements. Sixty-nine units of graduate credit is the minimum enrollment for the M.H.S. degree. At the end of the program, there are mandatory compre-

hensive written, oral, and practical examinations administered by a panel of pathology department faculty which all students must pass for successful completion of the program.

Grading Policies. Grades for all courses except the comprehensive final examination are assigned as follows: excellent/high pass (*H*), good/pass (*P*), satisfactory/low pass (*L*), failing (*F*), and incomplete (*I*). Failure in any course may result in removal from the program. If a student receives two *L*s, the student is placed on academic probation and required to perform additional studies for the director. All incomplete grades automatically revert to *F* if work is not complete within one semester or one summer session following award of the grade. The comprehensive final examination is pass/fail with the award of honors for outstanding students. Students who fail the final can register for one semester to prepare and take the examination again. Any student who fails the final twice cannot complete the program.

Curriculum

Year 1 Fall

CBI-200 Cell and Tissue Biology	3 credits
CBI-201 Microscopic Anatomy	3 credits
CBI-202 Medical Physiology	4 credits
BAA-200 Human Anatomy	3 credits
PTA-205 Immunology	3 credits

Year 1 Spring

PTH-250 General Pathology	4 credits
PTH-251 General Pathology Laboratory	4 credits
MIC-221 Medical Microbiology	4 credits
PTA-200 Introduction to Dissection	2 credits
PTA-201 Basic Neuroanatomy	1 credit

Year 1 Summer

PTA-210 Introduction to Autopsy Pathology	4 credits
PTA-220 Introduction to Surgical Pathology	4 credits
PTA-215 Histology Techniques	1 credit

Year 2 Fall

PTH-364 Systemic Pathology	3 credits
PTH-361 Autopsy Pathology	4 credits
PTA-230 Surgical Pathology	4 credits
PTH-258 Cellular and Subcellular Pathology	2 credits
PTA-216 Histology Techniques	1 credit
PTA-240 Photography	1 credit

Year 2 Spring

PTH-364 Systemic Pathology	3 credits
PTA-231 Surgical Pathology	4 credits
PTH-362 Autopsy Pathology	4 credits
PTA-217 Histology Techniques	1 credit
PTA-241 Photography	2 credits

Year 2 Summer

PTA-300 Autopsy Practicum	4 credits
PTA-301 Surgical Pathology Practicum	4 credits
PTA-302 Forensic Rotations	3 credits

Prerequisites for Admission

1. a baccalaureate degree in a biological or chemical science from an accredited institution;
2. a baccalaureate degree in a nonscience major but at least 12 credit hours in biological sciences and six credit hours in chemistry;
3. scores for the Graduate Record Examination (G.R.E.) taken within the last five years.

Candidates who receive their baccalaureate degrees from institutions outside the United States must submit a transcript evaluation showing degree equivalency and subject matter description.

Application Procedures. Application materials are mailed to prospective candidates for admission up to January 31 of the year of expected matriculation. Applications can be obtained by writing to: Dr. James G. Lewis, Director, Pathologists' Assistant Program, Department of Pathology, Box 3712, Duke University Medical Center, Durham, NC 27710. Telephone: (919) 684-2159. All applications must be received by February 15.

Applications must include:

1. a completed application form and a nonrefundable application fee of \$35;
2. official transcripts of all colleges and universities attended;
3. G.R.E. scores;
4. three letters of recommendation.

Candidates are notified of the admission committee's decision no later than April 15. Accepted candidates are required to submit a nonrefundable deposit of \$300 to retain their places in the class. This deposit applies to tuition.

Tuition, Fees and Estimated Costs for Year One:

Tuition	\$12,400 (40 credits at \$310/credit)
Fees	500
Books	421
Lab coats	123
Student health fee	(200/semester) 600
Student accident and hospitalization insurance	660 (single) \$2,082 (family)
Vehicle registration	120
Lodging	4,492
Food	3,588
Miscellaneous	3,921
Total	\$26,765

Financial Aid. Please refer to the section on student aid in the chapter, The Allied Health Programs. For more detailed information contact the Office of Financial Aid, Box 3067, Duke University Medical Center, Durham, NC 27710.

Courses of Instruction

BAA-305. Gross Human Anatomy. This is the medical school and anatomy graduate course in human anatomy. Students participate in a complete lecture series and in laboratory dissections of cadavers. Lectures and laboratory work are supplemented by conferences which emphasize biological and evolutionary aspects. 3 credits. *Staff*

CBI-200. Cell and Tissue Biology. This is the introductory medical school and graduate course in microscopic anatomy. Students participate in lectures and laboratories on the structure and function of cells and tissues of the body. Practical experience

in the use of the light microscope analyzing an extensive slide collection of mammalian tissues. 3 credits. *McIntosh and staff*

CBI-201. Microscopic Anatomy. Histology of all major organs of the body. Structure and cell biology at both the level of the light and electron microscope. 3 credits. *McIntosh and staff*

CBI-202. Medical Physiology. Medical and graduate level course on organ and cell physiology. Human and medical aspects are stressed. 4 credits. *Anderson and staff*

MIC-221. Medical Microbiology. Intensive study of common bacteria, viruses, fungi, and parasites that cause human disease. The didactic portion focuses on the nature and biological properties of microorganisms causing disease, the manner of replication, and their interaction with the entire host as well as specific organs and cells. 4 credits. *Staff*

PTH-250. General Pathology. This is the medical school core course in pathology. Lectures deal with broad concepts of disease and underlying molecular mechanisms. 4 credits. *Staff*

PTH-251. Laboratory Course in General Pathology. Fundamentals of pathology are presented by correlating gross and microscopic material to illustrate the structural changes in disease. Laboratories are broken into small groups of students and are held under the guidance of staff pathologists. 4 credits. *Staff*

PTH-258. Cellular and Subcellular Pathology. The course consists of lectures and seminars on the alterations of cellular structure and associated functions that accompany cell injury. 2 credits. *Shelburne and staff*

PTH-361, 362. Autopsy Pathology. A detailed consideration of the morphologic, physiologic, and biochemical manifestations of disease. Gross dissection, histologic examinations, processing, analyzing of all autopsy findings under tutorial supervision. 6 credits each course. *Lewis and staff*

PTH-364. Systemic Pathology. This is the medical school and graduate course in the detailed pathology of major organ systems. The course consists of lectures and seminars presenting the latest scientific concepts of disease. 6 credits. *Bradford and staff*

PTA-200. Introduction to Dissection. This is a course in basic tissue dissection techniques taught through participation in autopsies and using autopsy tissues. 3 credits. *Lewis and staff*

PTA-205. Immunology. This is a basic survey course in immunology that includes lectures on the function and interaction of the cells of the immune system, cytokine secretion and function, and the generation of humoral and cellular immune responses. 3 credits. *Kostyu*

PTA-210. Introduction to Autopsy Pathology. This is a summer rotation given during the first summer session. It is designed to acquaint the student with autopsy prosecution and workup. Students assist residents in full autopsy dissections. 4 credits. *Lewis and staff*

PTA-220 Introduction to Surgical Pathology. This is a rotation conducted during the first summer session. It is designed to acquaint students with the techniques of gross dissection, descriptions, and submission of tissue samples from surgical specimens. 4 credits. *Vollmer and staff*

PTA-215, 216, 217. Histology Techniques. These are rotations through various histology laboratories. These are designed to acquaint students with the various techniques used in tissue processing and special procedures. 1 credit each. *Dotson and staff*

PTA-230, 231. Surgical Pathology. These courses consist of thorough laboratory training in the orientation, description, and dissection of gross surgical specimens. Students follow many of the cases through to signout by the pathologist. 4 credits each. *Vollmer and staff*

PTA-240, 241. Photography. This is an introduction to medical photography. Students become familiar with photography equipment and the fundamentals of gross specimen photography. 1 credit each. *Reeves and Conlon*

PTA-300. Autopsy Practicum. This is the final autopsy rotation in which the students must perfect their dissection skills, demonstrate the ability to conduct full autopsy prosecutions in all possible situations, and write full preliminary autopsy reports. In addition, special dissection skills are taught in this course. 4 credits. *Lewis and staff*

PTA-301. Surgical Pathology Practicum. This is the final surgical pathology rotation in which the students must perfect their dissection skills and demonstrate the ability to orient, dissect, describe, and submit appropriate tissue samples from all commonly encountered surgical pathology specimens. 4 credits. *Vollmer and staff*

PTA-302. Forensic Rotation. Students rotate through the laboratories of the Chief Medical Examiner assisting in forensic autopsies. 3 credits. *Butts and staff*

The Physician Assistant Program

MASTER OF HEALTH SCIENCES CURRICULUM

Department of Community and Family Medicine:

Clinical Professor: James L. Michener, M.D. (Chairman)

Education Division:

Associate Clinical Professor: Reginald D. Carter, Ph.D., P.A. (Program Director)

Assistant Clinical Professor: Joyce A. Copeland, M.D. (Medical Director)

Assistant Clinical Professor: Patricia M. Dieter, M.P.A., P.A.-C. (Associate Program Director)

Assistant Clinical Professor: J. Victoria Scott, M.H.S., P.A.-C. (Director of Preclinical Education)

Assistant Clinical Professor: Philip A. Price, M.H.S., P.A.-C. (Director of Clinical Education)

Assistant Clinical Professor: Lovest T. Alexander, M.H.S., P.A.-C. (Director of Recruitment and Minority Affairs)

Assistant Clinical Professor: Paul C. Hendrix, M.H.S., P.A.-C. (Surgical Coordinator)

Clinical Associate: John C. Lord, B.H.S., P.A.-C. (Clinical Medicine Coordinator)

Clinical Associate: Gloria J. Jordan, M.H.S., P.A.-C. (F.A.H.E.C. Clinical Coordinator)

Clinical Associate: Robert Giggey, B.A., P.A.-C. (Emergency Department Coordinator)

The physician assistant (P.A.) concept originated at Duke over two decades ago. Dr. Eugene A. Stead Jr., then chairman of the Department of Medicine, believed that midlevel practitioners could increase consumer access to health services by extending the time and skills of the physician. Today, physician assistants are well-recognized and highly sought-after members of the health care team who, working interdependently with physicians, provide diagnostic and therapeutic patient care in virtually all medical specialties and settings. They take patient histories, perform physical examinations, order laboratory and diagnostic studies, and develop patient treatment plans. In thirty-five states, including North Carolina, P.A.s have the authority to write prescriptions. Their job descriptions are as diverse as those of their supervising physicians, and also may include patient education, medical education, health administration, and research.

The role of the graduate P.A. has evolved substantially over the past twenty-five years. While the majority of P.A.s in clinical practice continue to provide primary care services, the percentage serving in solo practice or private group settings has declined while the percentage practicing in institutional settings has risen. Today, over half of all graduate P.A.s are employed in large clinics, hospitals, and institutional settings. There are also more nonclinical positions developing for P.A.s; while these positions do not

involve patient care, they depend on a strong clinical knowledge base (e.g., drug study coordinator, clinical services coordinator, etc.).

In recognition of the increased responsibilities and expanded roles of P.A.s, the increased number of applicants with college degrees, and the quality of the P.A. educational program, the university began offering the Master of Health Sciences (M.H.S.) degree to graduates in 1992. The M.H.S. curriculum is designed to provide P.A.s with a greater depth of knowledge in the basic medical sciences and clinical medicine, as well as skills in administration and research. With these expanded skills, graduates can take advantage of the wide diversity of positions available to P.A.s.

Program of Study. The curriculum is twenty-five consecutive months in duration and is designed to provide an understanding of the rationale for skills used in patient assessment, diagnosis, and management. The first twelve months of the program are devoted to preclinical studies in the basic medical and behavioral sciences, and the remaining thirteen months to clinical experiences in primary care, medical and surgical specialties, and research study.

The preclinical curriculum is integrated in such a way as to introduce the student to medical sciences as they relate to specific organ systems and clinical problems. Learning strategies include the traditional lecture format and basic science laboratory, small group tutorials, and computer-assisted diagnostics using simulated patients. Regular patient contact is an important part of the first year curriculum. Students begin to see patients during the spring semester as part of the Patient Assessment course; this patient contact continues throughout the summer term of the first year.

As part of the clinical practicum, students are required to take rotations in inpatient medicine, surgery, emergency services, outpatient medicine, pediatrics, obstetrics/gynecology, and behavioral medicine. In addition to these rotations, two elective clinical rotations are included in the clinical year schedule, as is a four-week period devoted to development of a written research protocol. At least one clinical rotation must be completed in a medically underserved site. The final four weeks of the clinical year are spent in a specialty of the student's choosing; this final preceptorship often serves as a bridge to employment as a practicing P.A.

Because the clinical teaching is carried out in many practice settings throughout North Carolina and the southeast, students should plan on being able to travel away from the Durham area for part of their clinical experience.

Curriculum. Before proceeding into the clinical phase of the curriculum, students must satisfactorily complete the following:

Preclinical Year

Fall Semester

PAP-200. Basic Medical Sciences	5 credits
PAP-205. Anatomy	4 credits
PAP-210. Laboratory Medicine	4 credits
PAP-215. Physical Diagnosis	3 credits
PAP-220. Clinical Medicine I	4 credits
Total	20 credits

Spring Semester

PAP-211. Laboratory Medicine II	1 credit
PAP-221. Clinical Medicine II	9 credits
PAP-230. Fundamentals of Surgery	5 credits
PAP-235. Patient Assessment I	2 credits
PAP-240. Behavioral Aspects of Medicine	2 credits
Total	19 credits

Summer Term

PAP-222. Clinical Medicine III	7 credits
PAP-236. Patient Assessment II	1 credit
PAP-245. Perspectives on Health	2 credits
PAP-250. Health Systems Organization	2 credits
PAP-255. Introduction to Research and Epidemiologic Principles	3 credits
Total	15 credits

Clinical Year

Following successful completion of the preclinical courses, students enter the clinical phase of the program, completing the following experiences:

PAP-300. Outpatient Medicine	8 credits
PAP-305. Research Period	3 credits
PAP-310. Behavioral Medicine	4 credits
PAP-320. Inpatient Medicine	8 credits
PAP-340. General Surgery	4 credits
PAP-350. Emergency/Outpatient Surgery	4 credits
PAP-360. Pediatrics	4 credits
PAP-370. Obstetrics/Gynecology	4 credits
Elective	4 credits
Elective	4 credits
PAP-390. Preceptorship	4 credits
Total	51 credits

The student receives four credits for rotations which are four weeks in length, and eight credits for rotations which are eight weeks in length.

In addition to successful completion of the preclinical and clinical phases of the program, the P.A. student must also complete B.L.S., A.C.L.S., and the research period. The four-week research period is scheduled during the clinical training period.

Program Policies and Grading Standards. Grades for all courses and clinical rotations within the Physician Assistant curriculum are assigned on the basis of the following: honors (*H*), pass (*P*), low pass (*L*), and fail (*F*). The Physician Assistant Program is designed to integrate classroom and clinical learning experiences considered necessary for competency as health care providers. Therefore, the failure of any required course prevents a student from continuing in the program. Also, a student can receive no more than a total of three grades of "low pass" in the twenty-seven required courses during the clinical and preclinical phases of the program. Determination of satisfactory academic progress is made by the P.A. faculty at the conclusion of each semester/term.

A grade of "incomplete" (*I*) may remain on a student's transcript for one year only. After one year, a grade of "incomplete" automatically is converted to an *F* (fail). An extension to this one year limit may be granted by the program director; a request must be submitted in writing to the program director no later than thirty days prior to the expiration of the one year time limit.

Students in the Physician Assistant Program are participants in a professional training program whose graduates assume positions of high responsibility as providers of health care. Accordingly, students are evaluated not only on their academic and clinical skills but also on their interpersonal skills, reliability, appearance, and professional conduct. Deficiencies in any of these areas are brought to the student's attention in the form of a written evaluation and may result in probation, suspension, or expulsion from the program.

Satisfactory Academic Progress. Satisfactory academic progress for students in the Physician Assistant Program is construed as the successful completion of all require-

ments necessary for the advancement from one semester to the next. These requirements are as follows:

Preclinical Year: Completion of all required courses (a total of 54 credits) during the fall, spring, and summer terms within the scheduled semester or term and within one year of initial matriculation.

Clinical Year: Completion of all required core rotations, elective rotations, and a final preceptorship (a total of 51 credits) during the fall, spring, and summer terms; these rotations begin in the semester immediately following the completion of the preclinical year and must proceed as scheduled without interruption for three semesters/terms (thirteen and one-half months).

In unusual circumstances (including illness, academic remediation or irregular sequencing of courses) the determination of satisfactory progress for academic purposes is made by the program director of the Physician Assistant Program.

For financial aid purposes, federal regulations establish the maximum time frame for completion of the program at 150 percent of the minimum time required to complete the program. Any student exceeding the 150 percent maximum time frame is ineligible for Title IV (Stafford) student financial aid funds.

Attendance and Excused Absences. Students are expected to attend all lectures, laboratories, and seminars. Absences are excused only for illness or personal emergency, and students are expected to notify program faculty in advance of an expected absence.

Leave of Absence. A P.A. student, after presenting a written request to the P.A. program director, may be granted an official leave of absence for personal, medical, or academic reasons for a period not to exceed one calendar year. If the leave of absence is approved, the program director provides written notification including applicable beginning and ending dates to the student, the registrar, and the director of financial aid. The student must apprise the program director in writing of his or her wish to return to the P.A. Program or to extend the personal leave at least sixty calendar days prior to the anticipated date of re-entry. The student desiring an extension beyond one calendar year may be required to apply for readmission to the P.A. Program. When a leave of absence is taken, the program director may require the student to repeat some or all of the courses completed prior to the leave of absence. In all cases of leave of absence, the student is required to complete the full curriculum to be eligible to earn the P.A. certificate.

For purposes of deferring repayment of student loans during a school approved leave of absence, federal regulations limit the leave to six months.

Prerequisites for Admission. The prerequisites for admission to the M.H.S. physician assistant curriculum include:

1. a baccalaureate degree from an accredited institution. College seniors are eligible to apply, provided they receive the baccalaureate degree prior to the August starting date for the P.A. Program. Those candidates who received their baccalaureate degrees from colleges and institutions outside of the United States must complete at least one year (30 semester credits) of additional undergraduate or graduate study at a U.S. college or university prior to application to the program;
2. at least 11 semester credits in the biological sciences, including at least 3 credits each in anatomy and physiology. Courses in human anatomy and human physiology are preferred. At least 8 semester credits in chemistry are also required. These courses must be completed with grades of "C" or better (not C minus). Courses in microbiology and statistics are recommended, and preference is given to candidates who have completed these courses. Applicants from all academic disciplines are welcome, provided they meet the preparatory science course prerequisites;

3. scores of the Graduate Record Examination (G.R.E. general test), taken within the last four years. No other test scores are accepted *in lieu* of the G.R.E.;
4. a minimum of six months (1,000 hours) of health care experience, preferably with direct "hands-on" patient contact.

Application Procedures. Application materials are mailed to prospective applicants from June 1 through November 15 each year, and may be obtained by writing to: Admissions Coordinator, Physician Assistant Program, Box 3848, Duke University Medical Center, Durham, NC 27710, telephone: (919) 681-3155. Applications are accepted by the university no earlier than July 1 and no later than December 1 for the new class which enters in August each year. Applications must contain:

1. a completed official application (diskette or paper), including a nonrefundable application fee of \$40 (applications postmarked by November 1) or \$60 (applications postmarked by November 2 - December 1);
2. official transcripts from all colleges/universities and other postsecondary institutions attended;
3. scores of the Graduate Record Examination (G.R.E.). Applicants should take the G.R.E. in October or earlier;
4. three letters of recommendation, including one from a health care provider with whom the applicant has worked.

Selection Factors. The program has a specific interest in enrolling students from diverse social, ethnic, and educational backgrounds. Emphasis is placed upon personal maturity, quality of health care experience, dedication to the health field, and academic potential. Information submitted by each applicant is carefully reviewed by the Committee on Admissions and selected applicants are invited to Duke University for personal interviews. These interviews take place from January through early March; 44 students are chosen from among those interviewed. **Only full-time students are admitted.**

Candidates are notified of the admissions committee's decision as soon as possible after the interview, and no later than 1 April. Those candidates who have been accepted are asked to respond in writing with their decision and to confirm their place in the class by submitting the nonrefundable registration and deposit fees by May 1. Each year, a ranked alternate list of 10-15 candidates is selected from those candidates who have been interviewed for a position in the class. Should an accepted candidate withdraw from the program prior to the start of classes, the position is offered to the highest ranked candidate on the alternate list.

Tuition and Fees.* On notification of acceptance, prospective P.A. students are required to pay a nonrefundable first registration fee of \$50, as well as a nonrefundable program deposit of \$250. For those who do matriculate, the program deposit is applied to the cost of tuition.

Estimated expenses for the 1997 entering class of the Master of Health Sciences Physician Assistant Program are:

Tuition	\$340/credit (average annual tuition \$17,850 per year)
Books, uniforms, and instruments	1,300
Laptop computer rental fee	130 per month
Food	299 per month
First Year Fee (laboratory, etc.)	775
Lodging	374 per month
Student Health Fee	200 per semester
Student Accident and	660 per year—single
Hospitalization Insurance	2,082 per year—family
Miscellaneous (travel, clothing, etc.)	327 per month

*These are estimated figures only. Tuition and fees are subject to change without notice.

Health Insurance. All students are required to carry adequate health insurance throughout their enrollment in the P.A. program. If the student does not elect to take the Duke Student Accident and Hospitalization Insurance policy, evidence of other comparable health insurance coverage must be provided. The Student Health Fee is for all students.

Financial Aid. Qualified students may be eligible for Stafford Loans up to \$8,500, and up to \$16,500 in Perkins/P.A. Tuition Loans. Physician Assistant students may be eligible for up to \$10,000 in unsubsidized federal Stafford Student Loans. The North Carolina Student Loan Program for Health, Science, and Mathematics provides financial assistance in the form of loans up to \$6,500 per year for North Carolina residents; these loans may be cancelled through approved service in shortage areas, public institutions, or private practice. Limited scholarships funds are also available. All financial aid awards are made on the basis of documented financial need. Financial aid application packets are distributed on the admissions interview date.

The U.S. Public Health Service has several programs which offer scholarships, stipends, and loan repayment to P.A. students who commit to varying periods of employment within U.S.P.H.S. facilities. Interested applicants can call the National Health Service Program directly at 1-800-221-9393 for further information.

Applicants are encouraged to request information and application forms from clubs, organizations, foundations, and agencies as soon as possible after applying for admission to the program. Many libraries have information on sources of financial aid. Also, the financial aid offices at nearby colleges and universities often have information on sources of funding.

Some first year students are employed part-time; however, the rigor of the academic curriculum may prevent the student from maintaining part-time employment. **Because of the demands of the clinical year, it is difficult or impossible for the second-year student to work.**

More detailed information regarding financial aid can be obtained from the Office of Financial Aid, Box 3067, Duke University Medical Center, Durham, NC 27710.

Commencement. To receive the M.H.S. degree at the May commencement ceremony, the physician assistant student must successfully complete 89 credits including all preclinical courses, the research period, and all clinical rotations scheduled to that date. The P.A. program certificate of completion is awarded four months later in early September, following the student's completion of a total of 105 credits, the remaining clinical rotations, and the final preceptorship.

P.A. students should be aware that failure to begin or complete a clinical rotation as scheduled could delay receipt of both the M.H.S. degree and the P.A. program's certificate of completion. Furthermore, any incomplete rotations have to be made up prior to receiving the certificate of completion.

Courses of Instruction

Course credits are the recognized units for academic work in the P.A. Program. All courses are required and no transfer credit is accepted.

Preclinical Year Courses

PAP-200. Basic Medical Sciences. The basic facts, concepts, and principles that are essential in understanding the fundamental mechanisms of human physiology, pathology, pharmacology, and nutrition. This course presents the basic methods of clinical problem solving and serves as a prerequisite to the clinical medicine course by emphasizing the underlying principles of the etiology, management, and prevention of disease processes. 5 credits. *Carter*

PAP-205. Anatomy. Functional and applied anatomy stressing normal surface landmarks and common clinical findings. Topics for this course are sequenced with physical diagnosis (PAP-215). Cadaver prosections, anatomic models, lectures, and computer software are utilized in teaching this course. 4 credits. *Hendrix*

PAP-210, 211. Laboratory Medicine I, II. An introduction to the performance and interpretation of routine hematologic, urinary, microbiologic, and other laboratory procedures commonly used in practice. This course is taught by faculty/staff from the Department of Pathology and the hospital laboratories. 5 credits. *Schmidt*

PAP-215. Physical Diagnosis. An introduction to the techniques for performing and recording the physical examination. Taught in small-group format; lectures and audio-visuals are used, as well as extensive small group practice sessions. The final weeks of this course focus on orthopaedic physical diagnosis and common orthopedic problems. 3 credits. *Price*

PAP-220, 221, 222. Clinical Medicine I, II, III. The essentials of diagnosis and management of the most common clinical problems seen by primary care practitioners. Using an organ systems approach, clinical information is presented in conjunction with appropriate correlative lectures and labs in pathophysiology, pharmacotherapeutics, radiology, and nutrition. Patient simulations are used in the small group setting to enhance readings and lectures. This is a core course around which most other courses are organized. 20 credits. *Lord and Scott*

PAP-230. Fundamentals of Surgery. The basic surgical concepts needed for the P.A. to function in primary care settings as well as major surgical areas. The course emphasizes surgical technique and emergency procedures, as well as asepsis, minor procedures, and anesthesia. The animal surgery laboratory is an essential component of this course. 5 credits. *Hendrix*

PAP-235, 236. Patient Assessment I, II. An introduction to medical interviewing and the recording and presentation of clinical information. Teaching methods include lectures, small groups, and clinical assignments to inpatient areas as well as outpatient settings. For the first eight weeks of the course, students concentrate primarily on history-taking, and are assigned by their small-group instructors to interview patients on the wards. During the second eight weeks of the spring semester, and during the summer term, students are assigned in small groups to fellows from the Department of Medicine. Weekly, each student is assigned to a hospitalized patient to perform a complete history and physical examination. 3 credits. *Dieter*

PAP-240. Behavioral Aspects of Medicine. An introduction to the skills, knowledge, and sensitivity needed to communicate and intervene effectively in a wide variety of psychosocial situations. 2 credits. *Kertesz*

PAP-245. Perspectives on Health. A professional issues review. This course emphasizes current issues facing the profession, including legal and ethical problems and the unique place of P.A.s within the health care system. 2 credits. *Scott*

PAP-250. Health Systems Organization. An introduction to the structure and administrative principles in use in health care organizations. A lecture series taught by an interdisciplinary faculty and by community experts in health care organization. Topics include the patient as consumer, third-party payment, public policy trends, and organizational behavior. 2 credits. *Carter*

PAP-255. Introduction to Research and Epidemiologic Principles. Foundations of research methodology related to the study of disease distribution and issues in study design, data collection, and methods of analysis. The P.A. student develops a critical

review of the literature pertaining to an assigned clinical research question. 3 credits. *Yankaskas*

Clinical Year Courses

COMMUNITY AND FAMILY MEDICINE

PAP-300. Outpatient Medicine. This eight-week rotation emphasizes the outpatient evaluation and treatment of conditions common at the family medicine/primary care level, and the appropriate health maintenance measures for different age groups. An alternative track in outpatient medicine is also available for those students who have a specific vocational interest in primary care. 8 credits. *Staff*

PAP-305. Research Period. During a four-week research period in the clinical year, the student attends weekly seminars and develops a written research protocol. This course is a practical application of principles learned in PAP-255. 3 credits. *Yankaskas*

PAP-310. Behavioral Medicine. The student is assigned to a psychiatric and/or behavioral clinical setting, either inpatient or outpatient. This rotation facilitates the acquisition of communication and behavioral modification skills which is useful in the primary care setting. 4 credits. *Staff*

MEDICINE

PAP-320. Inpatient Medicine. During this eight-week rotation, the student learns to apply basic medical knowledge to the problems and situations encountered on an inpatient service. By collecting a data base, formulating a complete problem list, and participating in daily rounds and in the management of patient problems, the student develops an awareness of the complexity of disease processes and differential diagnosis. 8 credits. *Staff*

OBSTETRICS/GYNECOLOGY

PAP-370. Obstetrics/Gynecology. The student learns about common gynecological problems, pregnancy, and delivery. Assisting at the operating table may be a significant aspect of the rotation. The rotation emphasizes clinical experience with cancer detection techniques, abnormal menstruation and bleeding, infections, and contraception counseling. 4 credits. *Staff*

PEDIATRICS

PAP-360. Pediatrics. In this rotation, the student is assigned to either an institutional setting or a community-based pediatric site. Special emphasis is placed on communication skills and relating sensitively to both children and parents. The student gains familiarity with normal growth and development, pediatric preventive medicine, and evaluation and management of common childhood illnesses. 4 credits. *Staff*

SURGERY

PAP-340. General Surgery. The student is assigned by the chief resident to one of the surgical teams. This rotation emphasizes preoperative evaluation and preparatory procedures, assisting at the operating table, and management of patients through the postoperative period to discharge. 4 or 8 credits according to students vocational interest. *Staff*

PAP-350. Emergency/Outpatient Surgery. This rotation stresses the evaluation and management of surgical problems of the ambulatory patient. In the emergency room, the student gains experience in the initial evaluation of potential surgical conditions and performing problem-specific examinations and minor surgical skills. There is also the opportunity to followup patients on return visits. 4 or 8 credits, according to student's vocational interest. *Staff*

In addition to the above required core rotations, each student is required to complete two electives that can be chosen from among the following rotations. All are four weeks long.

COMMUNITY AND FAMILY MEDICINE

- PAP-301. Occupational Medicine
- PAP-302. Geriatric

MEDICINE

- PAP-321. Cardiology
- PAP-322. Dermatology
- PAP-323. Endocrinology
- PAP-324. Emergency Medicine
- PAP-325. Hematology/Oncology
- PAP-326. Hyperbaric Medicine
- PAP-327. Infectious Diseases
- PAP-331. Nephrology
- PAP-332. Neurology
- PAP-333. Pulmonary Medicine
- PAP-334. Rheumatology
- PAP-335. AIDS Clinical Trials Unit
- PAP-336. Medical ICU
- PAP-337. Coronary Care Unit

OPHTHALMOLOGY

- PAP-381. Ophthalmology

PEDIATRICS

- PAP-361. Pediatric Cardiology
- PAP-362. Pediatric Surgery/Cardiothoracic Surgery
- PAP-363. Pediatric Hematology/Oncology
- PAP-364. Pediatric Allergy/Respiratory
- PAP-365. Pediatric Endocrinology
- PAP-366. Pediatric Infectious Disease
- PAP-367. Intensive Care Nursery

SURGERY

- PAP-341. Cardiothoracic Surgery
- PAP-342. Otolaryngology
- PAP-343. Neurosurgery
- PAP-344. Orthopedics
- PAP-345. Plastic Surgery
- PAP-346. Sports Medicine
- PAP-347. Urology
- PAP-351. Emergency Medicine
- PAP-352. Trauma
- PAP-353. Adult Surgical ICU

Each of these electives is 4 credits. In addition to the electives listed above, a limited number of independent studies in which students construct their own need-specific learning experiences may be arranged. More detailed information on the elective and independent study rotations may be obtained from the director of Clinical Education of the Physician Assistant Program.

The final rotation in the P.A. program, immediately prior to receiving the program certificate of completion in September, is the preceptorship (PAP-390, 4 credits). This required rotation must be completed by all students. Students are encouraged to select

a preceptor in the area of their anticipated employment and, during this period of time, to explore the tasks and team aspects of functioning as a midlevel practitioner.

Graduate School Program

The Graduate School of Duke University awards a Master of Science degree to students who complete the program in physical therapy. Physical Therapy is a department in the Graduate School and additional information including courses of instruction may be found in the Graduate School bulletin which is available through the Office of Admissions, Graduate School, Duke University, Durham, North Carolina 27706. Graduate programs are also integral parts of Duke University Medical Center.

PHYSICAL THERAPY

Professor: Robert C. Bartlett, M.A., *Chairman*

Associate Professors: Margaret Schenkman, Ph.D.; Elia E. Villanueva, M.A.

Assistant Professor: Jan Gwyer, Ph.D., *Director of Graduate Studies*

Assistant Clinical Professors: Daniel Dore, M.P.A.; Carol C. Figuers, Ed.D.; Linda M. Lawrence, M.S.;

Mary Ellen Riordan, M.S.;

Clinical Associate: Elizabeth Ross, M.S.; R. Crouch, M.S.

Adjunct Associates: Dennis Bongiorno, B.S.; Susan E. Harryman, M.S.; Wadsworth D. Roy III, B.S.; Keith E. Varvel, M.P.H.

Emeriti: Eleanor Branch, Ph.D.; Grace Horton, B.S.

The Duke University Graduate Program in Physical Therapy, leading to the Master of Science degree, is a program for entry into the profession of physical therapy. The program is designed to provide a comprehensive foundation in the art and science of physical therapy, preparing individuals for clinical practice. Experiences in the areas of administration and research are also provided.

Program of Study. The fully accredited program of study requires fifty-two credit units of graduate course work, research, clinical affiliation, or other equivalent academic experience and is twenty-two consecutive months in length. Forty to forty-two units of work must be in physical therapy, seven units in designated courses in biological anthropology and anatomy, and neurobiology, and the remaining three to five units in electives in related fields. A research project is required which provides the opportunity to pursue a particular aspect of physical therapy in-depth.

Prerequisites for Admission. Requirements for admission to the physical therapy program include a baccalaureate degree, completion of prerequisite courses, Graduate Record Examination (G.R.E.) Aptitude Test scores, the filing of an application and, upon invitation, a personal interview. It is strongly recommended that the G.R.E. be taken no later than the October test date. Consult the Graduate School application for the deadline by which the application and all supportive documents must be received by the Graduate School Office of Admissions. Only completed applications are forwarded to the Graduate Program in Physical Therapy. No application forms are mailed after December 3. Only students for full-time study are accepted. State of residency does not influence admission policies or tuition costs. Requests for applications and further information should be directed to the Director of Graduate Studies, Department of Physical Therapy, Box 3965, Duke University Medical Center, Durham, North Carolina 27710, telephone 919/684-3135.

Tuition and Expenses. The 1997-98 academic year tuition for students enrolled in the Graduate Program in Physical Therapy is \$550 per credit unit. Estimated cost for the two-year program is approximately \$50,590, including tuition and living expenses.

Financial Aid. All students are encouraged individually to seek sources of financial assistance. Loan money may be available through the Duke University Medical Center. Financial aid applications are mailed to students after acceptance into the program.

Please refer to the section on student aid in the chapter, "The Allied Health Programs." Physical therapy students are not eligible for fellowships, assistantships, or traineeships offered by the Graduate School.



Certificate Programs

Duke University Medical Center has responded to the increased need for qualified individuals at all levels in the health care system by developing educational programs designed to equip people for a variety of positions. These programs, which vary in admission requirements and length of training, offer students both clinical and didactic experience. Graduates of these programs are awarded certificates.

Clinical Laboratory Science (Medical Technology)

Please note that the Clinical Laboratory Science Program is not accepting new students for the 1997-98 academic year.

Professor of Pathology: Salvatore V. Pizzo, M.D., Ph.D., *Chairman, Department of Pathology and Director of Clinical Laboratories*

Associate Professor of Pathology: Frances K. Widmann, M.D., *Medical Director, Clinical Laboratory Science Program*

Assistant Clinical Professor of Pathology: Margaret C. Schmidt, Ed.D., M.T.(A.S.C.P.)S.H., C.L.S.(N.C.A.), C.L.Sp.H.(N.C.A.), *Program Director, Clinical Laboratory Science Program*

Assistant Clinical Professor of Pathology: Cynthia L. Wells, Ed.D., M.T.(A.S.C.P.), C.L.S.(N.C.A.), *Assistant Program Director, Clinical Laboratory Science Program*

Medical Center Instructors in Pathology, Clinical Laboratory Science Program: Linda L. Seefried, M.A., M.T.(A.S.C.P.), C.L.S.(N.C.A.); Mary Ann Dotson, B.S., M.T.(A.S.C.P.), C.L.S.(N.C.A.); Patty Han-neman, M.S., M.T. (A.S.C.P.) S.B.B.; Debra J. Eveland, B.S., S.B.B.(A.S.C.P.).

Associate Professors: Emily Reisner, Ph.D.; John Toffaletti, Ph.D.; Peter Zwadyk, Ph.D.

Assistant Professors: John A. Bittikofer, Ph.D.; Steven Bredehoeft, M.D.

Medical Research Associate: Lizzie Harrell, Ph.D.

Clinical Teaching Staff: Billy H. Abrams, B.A., M.T.(A.S.C.P.); Marilyn Alexieff, B.A., M.T.(A.S.C.P.); Yolanda Bell, B.S., M.T. (A.S.C.P.); Mark Christy, B.A., M.H.S., C.L.S.(N.C.A.); Martha Rae Combs, B.S., M.T.(A.S.C.P.)S.B.B.; Betty R. Crews, B.S., M.T.(A.S.C.P.); Lynn Ferlisi, B.S., M.T.(A.S.C.P.); Brenda D. Hamm, B.S., M.T.(A.S.C.P.); Todd A. Hitch, B.S., M.T.(A.S.C.P.); Cathy Holleman, M.S., M.T.(A.S.C.P.)SC; Kelly Joyner, M.T.(A.S.C.P.)S.H.; Freda Kohan, B.S., M.T.(A.S.C.P.)SM; Kenneth Lynch, M.H.A., M.T.(A.S.C.P.); Janet Mueller, B.S., M.T.(A.S.C.P.); David Odom, B.S., M.T.(A.S.C.P.); Ann Padgett, B.H.S., M.T.(A.S.C.P.)SM; Norma Sabiston, B.S., M.T.(A.S.C.P.); Suzanne Schrack, M.T.(A.S.C.P.); Claudine Zimmerman, B.S., M.T.(A.M.T.).

Affiliate Institution Advisors: Robert K. Reid, Ph.D., *Meredith College*; Marsha E. Fanning, Ph.D., *Lenoir-Rhyne College*; Derek Barkelow, Ph.D., *Stetson University*; George Barthalmus, Ph.D., *North Carolina State University*; Steven Chalgren, Ph.D., *Radford University*; Karen E. Otto, Ph.D., *University of Tampa*; J. S. Waterhouse, Ph.D., *State University of New York at Plattsburgh*; Neal Summerlin, Ph.D., *Lynchburg College*; Wilbur C. Jones, Ph.D., *Concord College*; James W. Small, Ph.D., *Rollins College*; Richard Heller, Ph.D., *Albright College*; Anne Kendrick, M.S., M.T.(A.S.C.P.), *University of North Carolina at Wilmington*; Craig Allee, Ph.D., *Shorter College*; David Tate, Ph.D., *Purdue University*; Pinapaka Murthy, Ph.D., *Fayetteville State University*.

Program of Study. The educational program begins June 1 and consists of fifty-four instructional weeks which includes three weeks of vacation. The first four weeks consist of a core curriculum of courses offered to all students at the same time. After successful completion of the core curriculum, the student is eligible to begin forty weeks of coordinated coursework and clinical rotations in blocks of ten weeks each. After completion of the four major course and rotation blocks, a six-week term is devoted to a course of study in educational techniques, management and supervision, and quality assurance in health care. Lectures, student laboratory experience, and clinical laboratory instruction are presented by a faculty and staff of clinical laboratory scientists, physicians, chemists, and microbiologists.

Graduates of this N.A.A.C.L.S.-accredited program are eligible for national certification as clinical laboratory scientists. Career opportunities in hospital laboratories, research, public health facilities, and educational institutions are available. This program is formally affiliated with Meredith College, Raleigh, North Carolina; Lenoir-Rhyne College, Hickory, North Carolina; the University of Tampa, Tampa, Florida; Stetson University, Deland, Florida; North Carolina State University, Raleigh, North Carolina; Radford University, Radford, Virginia; State University of New York at Plattsburgh,

Plattsburgh, New York; Lynchburg College, Lynchburg, Virginia; Concord College, Athens, West Virginia; University of North Carolina at Wilmington, Wilmington, North Carolina; Shorter College, Rome, Georgia; Purdue University, West Lafayette, Indiana; and Fayetteville State University, Fayetteville, North Carolina, to provide the 3+1 study format toward a degree from these institutions. A cooperative agreement exists with Rollins College, Winter Park, Florida and Albright College, Reading, Pennsylvania to channel 4+1 students to this program.

Prerequisites for Admission. Applicants to the program must possess the following academic prerequisites:

1. possession of a baccalaureate degree OR the conclusion of at least three years of study in an accredited college or university with a total of ninety semester hours (120 quarter hours) of work completed with grades of C or better and the written guarantee that a baccalaureate degree will be conferred by a university after successful completion of this program;
2. four courses in major-track chemistry (including at least one course in organic chemistry);
3. four courses in major-track biology (including one course in microbiology);
4. one course of college level mathematics.

Application Procedures. A completed application file contains the following:

1. the completed Duke University Medical Center Allied Health application form, including a nonrefundable processing fee;
2. official transcript(s) from all colleges and universities attended;
3. three letters of recommendation, one from a professor of biological sciences, one from a professor of chemistry, and one from a college advisor;
4. a personal interview with members of the Admissions Committee, if requested, following the receipt of the application and other information;
5. a written statement of interest in clinical laboratory science;
6. evaluation of transcript credits earned outside the U. S. A., if requested.

The deadline for applications is April 1 of the year for which admission is requested. It is strongly recommended that applications be submitted by December 15 to receive timely consideration. Applications received after December 15 are considered on a space-available basis. Applicants are notified no later than May 1 regarding admission to the program. Requests for further information and application forms should be directed to the Clinical Laboratory Science Program Admissions, Box 2929, Education Service, Department of Pathology/Clinical Laboratories, Duke University Medical Center, Durham, North Carolina 27710.

Fees and Expenses. Tuition for the program is \$2,800. A lab fee is also assessed. The student is responsible for housing, board, uniforms, books, and student health fee and medical insurance.

A nonrefundable deposit of \$175 is required of all accepted candidates to hold their place in the class. This deposit applies toward the tuition fee. The remaining tuition and fee balance is billed in two increments: at matriculation and in January (mid-year).

Transportation Required. The use of facilities other than Duke and Durham Veterans Administration Medical Centers requires transportation. It is the responsibility of each clinical laboratory science student to provide a means of transportation to and from the facilities selected for learning experiences. Although a few sites may be within bicycling distance, most are not.

Financial Aid. Please refer to the section on student aid in the chapter, "The Allied Health Programs."

Part-time Employment. Students who wish to work are eligible to compete for available part-time paid positions within Clinical Laboratories *after* successful completion of the core curriculum and one major course and rotation block. Such positions are not to exceed a maximum of 19.9 hours per week.

Certification Examinations. Graduates of this program are eligible to sit for the national agency sponsored certification exam of their choice. Application forms and procedures are provided and explained as a service to enrolled students during the clinical year of education. Consistent with Medical School Policy, this program considers certification to be the responsibility of the individual. This curriculum is not directed to prepare students specifically for certification examinations; however, satisfactory performance in this program should provide sufficient information and experience to pass a certification exam. The Program Certificate is not dependent upon passing a certification exam.

Courses of Instruction. Students must complete the following courses:

Core Curriculum*	
<i>Course Title</i>	<i>Clock Hours</i>
	<i>Lect/Lab/Rotation</i>
Orientation Activities	50/00/00
CLS-103. Phlebotomy Principles and Procedures	10/00/40
CLS-107. Basic Principles of Immunology	35/00/00

Course and Rotational Blocks	
<i>Course Title</i>	<i>Clock Hours</i>
	<i>Lect/Lab/Rotation</i>
CLS-101. Issues in Clinical Laboratory Science	32/00/00
CLS-112. Biochemical Measurements and Disorders	130/88/160
CLS-120. Transfusion Medicine	120/60/200
CLS-121. Blood and Body Fluids	80/115/160
CLS-132. Medical Microbiology/Serology	57/81/240

Program Final Term	
<i>Course Title</i>	<i>Clock Hours</i>
	<i>Lect/Lab/Rotation</i>
CLS-113. Quality Improvement in Health Care	30/00/00
CLS-114. Elective/Alternate Site Rotation	00/00/40
CLS-124. Educational Techniques for the Health Professional	18/06/00
CLS-126. Laboratory Supervision and Management	26/00/00

Clinical Psychology Internship

Director of Clinical Training: W. Derek Shows, Ph.D.

The Division of Medical Psychology, Department of Psychiatry, Duke University Medical Center, offers internship training in clinical psychology to students who are currently enrolled in A.P.A.-approved Ph.D. programs in clinical psychology and who have already completed three years of graduate study. The program, approved by the American Psychological Association, provides experience in many contexts with a wide diversity of patients. Internship training provides experience in the traditional activities of clinical psychologists: assessment, consultation, treatment, and research.

Those successfully completing the requirements for internship are awarded a Duke University Medical Center certificate. Requests for additional information and correspondence concerning admission to the program should be directed to the Director,

*Course work in the core curriculum must be successfully completed to gain access to the courses which follow.

Clinical Psychology Internship Program, Box 3362, Duke University Medical Center, Durham, North Carolina 27710.

Ophthalmic Medical Technician

Professor: W. Banks Anderson, M.D., *Medical Director*

Associate Professor: Judy H. Seaber, Ph.D., *Program Director*

Teaching Staff: Lois Duncan, C.O., C.O.M.T., *Clinical Coordinator*

The Ophthalmic Medical Technician program is sponsored by the Department of Ophthalmology, Duke University Medical Center. This is a one-year certificate course designed to prepare the student to perform adequately as an ophthalmic medical technician. The program consists of didactic lectures designed to provide the basic clinical background necessary for the student to understand and perform the technical tasks designated to them by an ophthalmologist. The educational program begins July 1, and consists of fifty-two instructional weeks which include thirteen days of personal leave. The core curriculum is covered within the first four months supplemented by clinical experience under close supervision of clinical support staff and faculty. The following eight months consist of clinical rotations with the student working under the close supervision of qualified clinical support staff and faculty. Students are evaluated on a routine basis as their skills develop.

Upon satisfactory completion of the course, students receive certification from Duke University Medical Center and are eligible to sit for the national certification examination offered by the Joint Commission of Allied Health Personnel in Ophthalmology at the level of ophthalmic medical technician.

Prerequisites for Admission. Applicants to the program must have two years of college or the equivalent. Priority is given to students with a college degree or extensive work experience in some field of ophthalmology.

Application Procedures. Applications are reviewed between January 1 and May 1 of the year for which admission is requested and must contain the following:

1. The completed Duke University Medical Center Allied Health application form, including a nonrefundable processing fee;
2. Official transcript(s) from all colleges and universities attended;
3. Three letters of recommendation;
4. A personal interview with members of the admissions committee may be requested following receipt of the application and other information.

The deadline for applications is May 1 of the year for which admission is requested. It is strongly recommended that applications be submitted as early as possible. Applicants are notified no later than June 1 regarding admission to the program. Requests for further information and application forms should be directed to the Program Director, Judy H. Seaber, Ph.D., Box 3802, Duke University Eye Center, Durham, North Carolina 27710.

Fees and Expenses. Tuition for the program is \$2,800. The student is responsible for housing, board, books, the student health fee, and medical insurance. Fifty percent of the tuition is due at matriculation with the balance being due in January.

Transportation Required. It may be necessary for students to rotate at clinical sites other than at Duke University Medical Center and transportation may be necessary. It is the responsibility of the student to provide a means of transportation to and from the facility selected for learning experiences.

Financial Aid. Please refer to the section on student aid in the chapter, The Allied Health Programs.

Courses of Instruction. Students must satisfactorily complete the following courses. The curriculum includes but is not limited to the following:

COURSE TITLE	CLOCK HOURS
Orientation Lectures	50
Basic Science Lecture	125
Visual Acuity Assessment	10
Physiology and Anatomy of the Eye	15
Physical History	24
Cardiopulmonary Resuscitation	8
Instrument Maintenance	5
Visual Fields	24
Optics and Refractometry	40
Medical Terminology	12
Spectacles	10
Pharmacology	5
Glaucoma and Tonometry	15
External Ocular Diseases	8
Physiology of Systemic Diseases	12
Contact Lens and Keratometry	14
Ocular Motility	15
Neuro-Ophthalmology	5
General Psychology	5
Clinical Rotations I, II, III, IV, V, VI	1172
TOTAL	1574

Pastoral Care and Counseling

Associates in Instruction: Claude V. Deal, M.Div.; M. Susan Nance, Th.M.; James A. Rawlings, Jr., Th.M.; James L. Travis, Ph.D.

A graduate program in pastoral care and counseling is available to clergy, theological students, members of religious orders, and lay persons of all religious faith groups. There are five distinct program structures of Clinical Pastoral Education offered at Duke University Medical Center. All programs are designed to train individuals who desire to specialize in pastoral care, to enhance their skills as parish clergy, or to broaden their understanding of ministry. With the exception of the Parish-Based Extended Basic C.P.E. Program, all who enroll in any of the programs of Clinical Pastoral Education are required to serve as chaplains in the Medical Center. All programs are accredited by the Association for Clinical Pastoral Education, Inc.

Programs of Study. One unit of Clinical Pastoral Education is offered in three forms, including summer full-time C.P.E. (June-August), hospital-based extended C.P.E., and parish-based extended C.P.E. The extended units are offered concurrently with the fall and spring semesters of Duke Divinity School. The year-long residency program (June-May) earns four progressing units of C.P.E. Supervisory C.P.E. is designed for those seeking to be certified as a clinical pastoral education supervisor and is offered as available.

Requests for application and further information about any of the programs should be directed to the Director, Pastoral Services, Box 3112, Duke University Medical Center, Durham, North Carolina 27710. Admission procedures to each program include:

1. completion and submission of written application materials;
2. an admission interview by a qualified interviewer;
3. acceptance by the Duke University Medical Center C.P.E. Center.

In addition to the above admission procedures, requirements for admission to specific C.P.E. programs include:

1. completion of a consultation process between a Duke University Medical Center C.P.E. supervisor and a church board (Parish-Based Extended C.P.E.);
2. graduation from college and seminary (equivalences may be considered); and adequate ministry formation/development and experience in ministry which indicates readiness for this program (Residency C.P.E. Program);
3. a personal interview with Duke University Medical Center faculty (Residency and Supervisory C.P.E.);
4. ecclesiastical endorsement; pastoral experience of usually not less than three years; completion of program objectives of A.C.P.E.; residency and consultation by the appropriate committee in the region with respect to his/her readiness to pursue supervisory training (Supervisory.);
5. submission of previous basic C.P.E. unit(s) final evaluation by student and supervisor(s) (Residency and Supervisory C.P.E.);

Salary and Fees. Stipends are available for students in the Residency Program and the Supervisory C.P.E. Program. For 1996-97, the salary for the Residency Program is \$19,000, and for the Supervisory C.P.E. Program the salary is \$21,000. There is no salary available for summer full-time and extended C.P.E. units. Salaried students are eligible for the same benefit package as Duke University employees of comparable levels.

Tuition is \$425 per unit when enrolled through the Allied Health Division of Duke University Medical Center (\$325 for two or more consecutive units), and \$2,140 per unit when enrolled through Duke University Divinity School for academic credit. (A unit of C.P.E. equals two academic courses.)

Fees include the following:

1. an application fee of \$30 must accompany an Allied Health form, unless applying with intention of enrolling through Duke University Divinity School;
2. \$40 for admission interviews when requested;
3. \$100 tuition deposit for those accepted into the year-long Residency Program;
4. \$50 tuition deposit for students accepted into the summer full-time and extended C.P.E. programs;
5. \$55 per unit for mid-Atlantic region fee.

Residency in Pharmacy Practice

Director, Pharmacy Practice Residency: D. Byron May, Pharm.D., B.C.P.S.

Director of Pharmacy Services: James C. McAllister III, M.S.

The Pharmacy Practice Residency is a twelve-month postgraduate program conducted by the Department of Pharmacy at the Duke University Medical Center. The residency is designed to give the graduate pharmacist extensive training in pharmacy practice.

Admission Standards. Applicants must be graduates of accredited schools of pharmacy and must have a Doctor of Pharmacy (Pharm.D.) degree. Residency candidates must demonstrate superior academic and leadership capabilities and be eligible for licensure in North Carolina. It is preferable that the applicant have previous hospital experience.

Application Procedures. Applications must be submitted by early January of the year for which admission is requested and include the following:

1. an A.S.H.P./National Matching Services resident matching program application code number;

2. an official transcript from pharmacy school and other professional programs attended;
3. completed residency application forms; and
4. letters of recommendation from at least three persons who have known the applicant professionally (e.g., pharmacy school professor, hospital pharmacist, clinical pharmacist).

Applicants are notified in April regarding admission to the program. Requests for further information and application forms should be directed to D. Byron May, Pharm.D., B.C.P.S., Director for Residency Training, Box 3089, Duke University Medical Center, Durham, North Carolina 27710.

Stipend. A stipend of \$30,000 is granted for the twelve-month residency.



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1997-98

Nicholas School of the Environment



The Mission of Duke University

The founding Indenture of Duke University directed the members of the university to "develop our resources, increase our wisdom, and promote human happiness."

To these ends, the mission of Duke University is to provide a superior liberal education to undergraduate students, attending not only to their intellectual growth but also to their development as adults committed to high ethical standards and full participation as leaders in their communities; to prepare future members of the learned professions for lives of skilled and ethical service by providing excellent graduate and professional education; to advance the frontiers of knowledge and contribute boldly to the international community of scholarship; to foster health and well-being through medical research and patient care; and to promote a sincere spirit of tolerance, a sense of the obligations and rewards of citizenship, and a commitment to learning, freedom, and truth.

By pursuing these objectives with vision and integrity, Duke University seeks to engage the mind, elevate the spirit, and stimulate the best effort of all who are associated with the university; to contribute in diverse ways to the local community, the state, the nation, and the world; and to attain and maintain a place of real leadership in all that we do.

bulletin of
Duke University
1997-98

Nicholas School of the Environment

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The information in this bulletin applies to the academic year 1997-98 and is accurate and current, to the extent possible, as of August 1996. The university reserves the right to change programs of study, academic requirements, teaching staff, the calendar, and other matters described herein without prior notice, in accordance with established procedures.

Duke University does not discriminate on the basis of race, color, national origin, handicap, sexual orientation or preference, gender, or age in the administration of educational policies, admission policies, financial aid, employment, or any other university program or activity. It admits qualified students to all the rights, privileges, programs, and activities generally accorded or made available to students. For further information, contact Leonard C. Beckum, university provost and vice-president (919) 684-4736.

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University Administration

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Calendar*

1997

August	
25	Fall term begins at Marine Laboratory
26	Orientation for fall semester
27-28	Registration of new and nonregistered returning students
September	
2	Fall semester classes begin - Durham and Marine Lab
15	Drop/add ends
October	
13-14	Fall break
29	Registration begins for spring semester, 1998
November	
18	Registration ends for spring semester, 1998
19	Drop/add begins
26	Thanksgiving recess (begins at 12:40 p.m. Wednesday)
December	
1	Classes resume
5	Fall semester classes end
6-14	Graduate reading period
13	Fall term ends at Marine Laboratory
15-20	Final examinations

1998

January	
8	Spring term begins at Marine Laboratory
12	Orientation for spring semester
13	Registration of new and nonregistered returning students
15	Spring semester classes begin - Durham and Marine Lab
28	Drop/add ends
March	
16-20	Spring break
31	Registration for fall semester, 1998 begins
April	
15	Registration for fall semester, 1998 ends
16	Drop/add begins
24	Spring semester classes end
25	Graduate reading period begins
May	
2	Spring term ends at Marine Laboratory
3	Graduate reading period ends
4-9	Final Examinations
11	First summer term begins at Marine Laboratory
17	Commencement
June	
12	First summer term ends at Marine Laboratory
15	Second summer term begins at Marine Laboratory
July	
17	Second summer term ends at Marine Laboratory
20	Third summer term begins at Marine Laboratory
August	
21	Third summer term ends at Marine Laboratory

*The dates in the calendar are tentative and subject to change.

TO THE PROSPECTIVE STUDENT

In 1991, Duke University signaled a new approach to education and research in marine and terrestrial ecosystems, earth sciences, and human-environment interactions with the inauguration of the School of the Environment. The School of the Environment's mission of providing education, research and service toward the understanding of basic environmental processes unites two centers of excellence with long and distinguished histories at Duke—the former School of Forestry and Environmental Studies and the Marine Laboratory. The school, with its unprecedented commitment to education and research addressing the quality of the Earth's environment and the sustainable use of its natural resources, is uniquely positioned, now, in the context of American higher education to lead the way in solving complex environmental problems in a rapidly changing world.

The programs of the Nicholas School of the Environment are based on the premise that the most challenging global environmental problems are so complex that they cannot be solved effectively within the context of a single discipline. Science can provide crucial research and data, but cannot supply the process for bringing that information to bear on the creation of regulatory policy; policy studies alone are often in danger of fostering the implementation of solutions with inadequate scientific bases; proposed solutions to environmental challenges that ignore the economic forces that will inevitably come to bear on them have little chance of success. An interdisciplinary approach is absolutely mandatory.

The Nicholas School of the Environment at Duke University, then, is committed to bringing together around crucial global problems the best scholars from the wide range of academic disciplines necessary to produce real, workable solutions to these problems, as well as to producing environmental managers and scholars that will become the leaders in these areas in years to come.

Our graduates are among the leaders of the nation's largest environmental consulting firms and industries with environmental interests, as well as the public agencies and nonprofit organizations that monitor, manage and regulate natural resources and the environment. We have proven that we are among the best at what we do.

Our objective, however, is not merely research published or students graduated. It is wise and sustained management of our natural resources and a better environment for this and future generations. We invite you to join us in pursuit of these goals.

A handwritten signature in dark ink, reading "Norman L. Christensen". The signature is fluid and cursive, with the first name "Norman" and last name "Christensen" clearly legible.

Norman L. Christensen, Jr.
Dean, Nicholas School of the Environment

General Information



Introduction

The mission of the Nicholas School of the Environment is education, research, and service to understand basic environmental processes and to protect and enhance the environment and its natural resources for future generations. Intrinsic to this mission are (1) a commitment to interdisciplinary approaches, (2) a commitment to objective and, where possible, quantitative approaches, (3) a commitment to principles of ecological integrity, (4) a commitment to the sustainable use of natural resources, and (5) a commitment to environmental education at all levels. The overall objective is to assist in the definition and resolution of problems confronting society, through excellence in natural resource and environmental education and research.

The school's emphasis is on defining objectives for natural resource science and management, understanding the interrelated constraints—physical, biological, chemical, ecological, economic, legal and social—and devising and testing alternative management solutions. This approach to natural resource education is pursued through research, formal courses, field studies and seminars, and informally through interaction with practicing professionals by a variety of means.

Research and problem solving are integral to the school's mission. The faculty is engaged in a dynamic program of research, much of which is focused on contemporary natural resource and environmental issues, both terrestrial and marine, that are regional, national, and global in scope. Students are also encouraged to involve themselves in real world problems. As part of their professional degree requirements, students must complete a master's project requiring independent research and problem analysis.

Teaching and research in the Nicholas School of the Environment are focused within the following curriculums: Biohazard Science; Coastal Environmental Management; Environmental Toxicology, Chemistry and Risk Assessment; Forest Resource Management; Resource Ecology; Resource Economics and Policy; Water and Air Resources; and the ocean sciences. These programs are designed for students drawn from a wide variety of undergraduate backgrounds in the natural and social sciences, forestry, engineering, business and environmental studies. Program requirements enable all students to acquire the basic technical skills, scientific knowledge, insight and methods of analysis for resolving natural resource and environmental problems.

As a professional school within a private university, the Nicholas School of the Environment is able to foster independent consideration of natural resource and environmental issues without the political pressures often brought to bear upon public institutions. As part of a major research university, the school is able to add a significant dimension to teaching and research through cross-campus interdisciplinary degree programs, faculty appointments, and cooperative projects.

Additional enrichment is available through relevant departments at neighboring universities, as well as through agencies and institutions at the Research Triangle Park and in the Beaufort-Morehead City area. These opportunities for study and professional interaction place Duke in an enviable position among schools of resource science and management and greatly enhance the quality of its programs.

Alumni of the Nicholas School of the Environment hold leadership positions in public agencies, environmental and forestry consulting firms, private industry, and not-for-profit organizations throughout the nation and the world.

History

Duke University developed from Union Institute, a small school established in 1838 in Randolph County, North Carolina. The name was changed to Normal College in 1851, and in 1859, to Trinity College. The college was moved to Durham in 1892. With the establishment of the James B. Duke Indenture of Trust in 1924, Trinity College became Duke University. At the outset, the university developed around a core of undergraduate programs. In 1932, forestry instruction was offered for students of Trinity College, and in 1938 the School of Forestry was established as a graduate professional school under the direction of Dean Clarence F. Korstian. The Master of Forestry and Doctor of Forestry degrees were offered initially and later the A.M., M.S., and Ph.D. were offered through the Graduate School. The school's forestry program has been fully accredited by the Society of American Foresters since 1939.

Dr. Korstian joined the faculty in 1931 as the first director of the Duke Forest. Brought to Durham by Dr. William P. Few, president of Duke at the time, Dr. Korstian set out to develop a "demonstration and research forest" that would serve as a model for owners of small tracts of timber in the South. During the 1930s the faculty of the school was gradually expanded to include a number of research foresters who made substantial contributions to forestry in the Southeast. This faculty established and brought early recognition to the school.

Growing national concern with natural resources and environmental problems led to a new teaching and research emphasis in ecology in the 1970s. In 1974 the name was changed to the School of Forestry and Environmental Studies and a new degree was added, the Master of Environmental Management.

Duke University's marine laboratory also had its beginnings in the the 1930s when Dr. A. S. Pearse and colleagues from Duke were attracted to Pivers Island and its surrounding abundance of marine life for their summer field studies. The island afforded an excellent location for a field station and through the subsequent efforts of Dr. Pearse and others, the land was acquired for the Duke University Marine Laboratory. Construction began and by 1938 the first buildings were erected. Originally, the laboratory served only as a summer training and research facility. Today, it operates year-round to provide training and research opportunities to about 3,500 persons annually, including undergraduate, graduate and professional students enrolled in the university's academic programs; visiting student groups who use the laboratory's facilities; and scientists who come from North America and abroad to conduct research.

In 1991, the School of Forestry and Environmental Studies was combined with the Duke University Marine Laboratory to form the School of the Environment. The new school is an unprecedented university commitment to interdisciplinary education and research in environmental science, policy, and management. It is the only private graduate professional school of its type in the country.

Location

Duke University is situated on the outskirts of Durham, a city of over 198,000 inhabitants, in the central piedmont region of North Carolina. The Appalachian escarpment lies approximately 100 miles to the west of Durham and the coastal plain is but a short distance to the east. The Marine Laboratory is located 180 miles to the east of Durham, on Pivers Island within North Carolina's Outer Banks, adjacent to the historic town of Beaufort. The school is thus ideally situated near areas of ecological and topographic diversity which offer many opportunities for study as well as recreation.

Piedmont North Carolina is characterized by a rolling, forested topography interspersed with small farms and rural communities in addition to the state's largest cities. The climax forests of the piedmont are hardwoods; however, human disturbance has resulted in the establishment of many forests of the native southern pines.

The southern Appalachians are widely known for their unusual history, picturesque topography, and wide range of flora and fauna. Here the typical hardwood forests which dominate at lower elevations give way to forests of spruce and fir at higher elevations. The region's numerous recreation areas are widely used for hiking, fishing, skiing, and other outdoor activities.

The coastal plain of North Carolina, well known for its agricultural production, is used extensively by many of the nation's forest industries for plantations of the native pines. Coastal wetlands and estuaries, now recognized as one of the nurseries of world fisheries, offer abundant and valuable natural resources. North Carolina's Outer Banks and the barrier islands of the other southeastern states serve as protection for these coastal waters. The rapidly increasing population and development in this region make proper management of its natural resources particularly important to the nation.

Because of the school's central location near these regions of vital ecological importance, students are afforded the opportunity to study many current environmental problems in the field. Both the opportunity and the challenge exist to analyze these pressing problems and to develop sound approaches to their management.

Facilities

The Nicholas School of the Environment is housed in the Levine Science Research Center, an interdisciplinary research facility situated at the corner of Science Drive and Research Drive on the West Campus. The new building includes state-of-the-art classrooms, research laboratories and instrumentation supporting both teaching and research for the programs offered by the school. A lounge, reading room, and computer laboratories are provided for students. Fully equipped modern teaching and research facilities for the ocean sciences are available at the school's coastal campus in Beaufort, N.C.

Computer Facilities. Duke's Computer Assist Center works in partnership with members of the university community to enable them to achieve their academic and research goals through computing. The center provides access to a variety of computing facilities and services through DukeNet, a high-speed data network, and various types of telecommunications linkages. The center maintains extensive MS-DOS/Windows and Macintosh personal computer and DEC workstation facilities at a number of locations on the Durham campus and at Beaufort. All laboratories and clusters are equipped with either dot matrix or laser printers and several are connected to the campus telecommunications network. Electronic mail services are available for faculty and graduate students.

Other services include access to the national Internet data network and the Cray Y-MP/432 and massively parallel computing at the North Carolina Supercomputing Center and other supercomputer centers. Access to Duke's IBM ES/9000 mainframe computer is also available through the Computer Assist Center.

Libraries. The combined university libraries, including the main Perkins Library and twelve other school or branch libraries, contain over 4,200,000 volumes. About 150,000 volumes are added annually. The collection includes about 9,500,000 manuscripts and over 2,000,000 public documents.

The Biology-Forestry Library, located in the Biological Sciences Building, contains over 170,000 volumes and receives nearly 1,000 periodicals related to natural resources and the environment.

The Pearse Memorial Library on the Beaufort campus is a branch of the Duke library system. It holds approximately 23,000 volumes with a concentration on the marine

sciences and subscribes to fifty-five scientific journals. Support services include interlibrary loan and on-line literature search capabilities. Cooperative agreements provide access to the libraries of the National Oceanic and Atmospheric Administration, National Marine Fisheries Service, University of North Carolina Institute of Marine Sciences, and the University of North Carolina at Wilmington.

Greenhouses and the Phytotron. Adjoining the Biological Sciences Building on Duke's West Campus are excellent facilities for biological investigations under controlled conditions. The phytotron contains fifty separately controlled growth chambers and greenhouses which can be used to grow plants under a variety of environmental conditions. The phytotron is one of few such facilities in the United States.

Research Triangle Park. Numerous industrial and governmental organizations have established research facilities in the Research Triangle Park, ten miles from the Duke campus. Government facilities include the National Environmental Research Center of the Environmental Protection Agency, the Forestry Sciences Laboratory of the United States Forest Service Southeastern Forest Experiment Station, and the National Institute of Environmental Health Sciences. These laboratories provide opportunities for student research and internships in some of the nation's most advanced research facilities.

Coastal Resources. The Beaufort-Morehead City area provides location for five facilities that collectively house one of the higher concentrations of marine scientists in the nation. These are the University of North Carolina's Institute of Marine Sciences, the North Carolina State University Seafood Laboratory, the North Carolina Aquarium at Bogue Banks, North Carolina Division of Marine Fisheries; and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service, Beaufort Laboratory. This concentration of marine scientists provides a critical mass for the pursuit of science and education.

Neighboring Universities. Through a reciprocal agreement, Duke students may supplement their education in forestry and the environmental sciences by taking courses in related fields at the University of North Carolina in Chapel Hill, North Carolina State University in Raleigh, and North Carolina Central University in Durham. Graduate students of Duke University and the University of North Carolina at Chapel Hill are granted library loan privileges in both universities.

The Duke Forest

The Duke Forest comprises approximately 7,700 acres of land in five major divisions and several smaller tracts. A ten-minute walk from campus will take one well into many parts of the Durham Division, and a network of roads and fire trails makes almost all areas of the forest easily accessible.

The forest lies primarily in Durham and Orange counties, near the eastern edge of the piedmont plateau, and supports a cross section of the woodlands found in the upper coastal plain and lower piedmont of the Southeast. A variety of timber types, plant species, soils, topography and past land use conditions are represented. Elevations range from 260 to 760 feet. Soils of the region are derived from such diverse parent materials as metamorphic rock of the Carolina slate formation, granite, Triassic sedimentary rock, and basic intrusives.

The Duke Forest, as it is known today, had its origins in the mid-1920s when the university administration bought many small farms and interspersed forest land as buffer areas for the main campus and as an investment for the future. The forest was placed under intensive management in 1931 by Dr. Clarence Korstian, its first director. In its early development, several basic objectives were emphasized: (1) demonstration of timber management techniques on a practical and economic basis, (2) development

of an experimental forest for research in the sciences associated with timber growing, and (3) development of the area as an outdoor laboratory for students of forestry.

Modification of these early objectives has arisen, in part, through a greatly increased interest and dependence on the forest for research in the areas of zoology, botany, and ecology by faculty and students at Duke and neighboring universities. Background information useful to researchers is provided by the forest; it covers such features as soils, topography, inventory, plantation, and cultural records as well as a bibliography of past and current studies. Current work on problems associated with developmental pressures at the urban-rural interface and integrated approaches to natural resource management have multiplied the forest's value and benefit as a resource.

Since 1976, the Duke Forest has been included in a nationwide network of research sites selected by the Institute of Ecology under a program sponsored by the National Science Foundation. These sites, designated as experimental ecological reserves, were selected to provide a wide range of conditions and habitat types for long-term scientific research in a multitude of disciplines.

The forest also serves in an educational and recreational capacity for residents of the Durham and Chapel Hill communities. Hiking, picnicking, jogging, and nature study are particularly popular pastimes.

This natural outdoor laboratory is an invaluable supplement to the instructional, research, and recreational facilities of the school, the university, and the region. The Duke Forest—in terms of its size, diversity, proximity to campus, and more than sixty years of accumulated research data—is a natural resource unequaled at any other academic institution.

Faculty



Core Faculty



Dianne Ahmann, Ph.D., *Assistant Professor*; B.A., Biochemistry and Molecular Biology, Harvard College; Ph.D., Biology, Massachusetts Institute of Technology.

Dr. Ahmann's research concerns the roles of microorganisms in the biogeochemical cycling of metals and trace elements. Microbially-catalyzed oxidations and reductions are of particular interest because they can dramatically alter chemical properties and consequent behavior of metallic elements in natural systems. Her current research investigates the physiology and ecology of anaerobic arsenic-respiring bacteria which gain energy by coupling organic carbon oxidation to

arsenic reduction in a process analogous to the energy-yielding oxygen reduction carried out by aerobes. Arsenic mobility is greatly increased by this reduction, accelerating local arsenic cycling and suggesting applications in removing arsenic from contaminated solids.

Additional research is planned to explore a possible interaction between certain soil bacteria and plants under iron-limiting conditions common in alkaline soils. In this interaction, microbial metabolism of root-secreted phenolic molecules may lead to reduction of insoluble iron(III) in iron oxyhydroxides to the more available iron(II), improving iron nutrition and consequent growth potential in plants.



Richard T. Barber, Ph.D., *Harvey W. Smith Professor*; B.S., Zoology and Botany, Utah State University; Ph.D., Biological Science, Stanford University.

Dr. Barber's research in carbon cycling by ocean processes has implications for climate regulation. At Duke he investigates the interrelationship of large-scale thermal dynamics and ocean basin productivity, emphasizing (1) how biological and physical processes contribute to the exchange of carbon dioxide between the ocean and the atmosphere and (2) how the "biological pump" transfers carbon into the deep sea. With current field work being carried out on cruises in the equatorial

Pacific and in the Arabian Sea, his research group is focusing on the role of physical conditions in regulating primary production and phytoplankton performance. He is also investigating the role of a single micronutrient, iron, in the regulation of primary production in a part of the ocean, the equatorial Pacific, where a high nutrient/low chlorophyll character persists despite physical and chemical conditions which otherwise favor high productivity.

He is in residence at the Marine Laboratory.

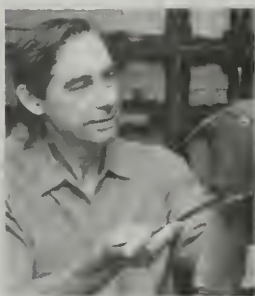


Celia Bonaventura, Ph.D., Professor; B.A., Zoology, San Diego State University; Ph.D., Biochemistry, University of Texas, Austin.

Most of Dr. Celia Bonaventura's research is in the area of structure/function relationships of oxygen and electron-transport proteins. This continues to be her primary area of research, with an increasing focus on environmental perturbations of structure and function. Her research makes use of structural assays and complementary measurements of rapid reaction kinetics and equilibria, using UVMS and fluorescence spectroscopy and spectroelectrochemistry. Through comparison of

human proteins with proteins of species inhabiting diverse environments, studies by Dr. Bonaventura and collaborators have increased the understanding of structural mechanisms that allow respiratory proteins to satisfy widely different physiological and environmental demands. Her current research concerns aspects of environmental toxicity associated with free-radical interactions with respiratory proteins and structural alterations of respiratory proteins that are indicative of exposure to xenobiotics.

She is in residence at the Marine Laboratory.



Joseph Bonaventura, Ph.D., Professor; B.A., Zoology, San Diego State University; Ph.D., Biochemistry, University of Texas, Austin.

Dr. Joseph Bonaventura's research involves marine organisms found in diverse environments. Biochemical studies on the structural and functional diversity of these organisms has been shown to be paralleled by diversity at the molecular level. Red cells and respiratory proteins of marine organisms are being studied in order to increase the understanding of molecular adaptations and the mechanisms that give rise to functional flexibility. The kinetics and equilibria of ligand binding

to hemoglobins, hemocyanins, and cytochrome c oxidase are studied with emphasis on the reactivity of these proteins as regulated by metabolic effectors. These studies are complemented by work in the Protein Engineering and Technology Laboratory where properties of chemically modified, crosslinked, and immobilized forms of biologically active molecules are characterized. Recent research concerns the development of a synthetic blood substitute for humans. The project involves a detailed study of structure-function relationships in the human hemoglobin molecule and includes site-directed mutagenesis of hemoglobin genes. A new focus concerns the biochemistry of nitric acid in the human body and the development of a hypothesis of how this simple molecule might act as a regulator of the biosphere.

He is in residence at the Marine Laboratory.



Norman L. Christensen, Jr., Ph.D., Professor; B.A., M.A., Biology, California State University, Fresno; Ph.D., Biology, University of California, Santa Barbara.

Dr. Christensen is interested in the effects of disturbance on the structure and function of populations and communities. On-going studies include an analysis of patterns of forest development following cropland abandonment as these are affected by environment, stand history, and plant demographic patterns. This research focuses on the historical data sets and resources of the Duke Forest. He is also conducting research on the southeastern coastal plain and western Sierra Nevada focused on a comparison of biogeochemical and community responses to varying fire

of biogeochemical and community responses to varying fire

regimes. These studies are aimed at an understanding of the evolutionary and ecosystem consequences of fire and the application of such information in the development of wilderness management and policy protocols. In addition, Dr. Christensen is conducting research on the use of remote sensing systems, such as synthetic aperture radar, to evaluate long-term changes in forest ecosystems.



Larry B. Crowder, Ph.D., *Professor*; B.A., Biology and Mathematics, California State University, Fresno; M.S., Ph.D., Zoology, Michigan State University.

Dr. Crowder's research centers on predation and food web interactions, mechanisms controlling recruitment variation in fishes, and on population modeling in conservation biology. He has studied food web processes in estuaries and lakes, and has used observational, experimental and modeling approaches to understand these interactions in an effort to improve fisheries management. He is a member of the Program Management Committee for SABRE (South Atlantic Bight Recruitment Experiment), a NOAA-funded project that focuses on identifying the unique characteristics of survivors of a cohort of fishes and links those characteristics to physical or biological variability. He has also been involved in population modeling and data analysis to address various management scenarios for threatened and endangered species. He and his students have developed life-history population models to address various management problems including exotic species introductions, acidification, habitat modification, bycatch and harvest for both freshwater and marine fishes.

He is in residence at the Marine Laboratory.



Richard T. Di Giulio, Ph.D., *Associate Professor*; B.A., Comparative Literature, University of Texas; M.S., Wildlife Management, Louisiana State University; Ph.D., Wildlife Biology, Virginia Polytechnic Institute and State University.

Dr. Di Giulio's research group in environmental toxicology is chiefly involved with integrated basic and applied research in aquatic biochemical toxicology. Basic studies focus on xenobiotic metabolism and modes of action in lower vertebrates and invertebrates. Results of these studies are used to develop sophisticated, sensitive biochemically based indices (biomarkers) of environmental quality.

He is particularly interested in the application of free radical biology theory to the elucidation of mechanisms of contaminant metabolism and toxicity in aquatic animals. Recent research in this vein has included studies of contaminant mediated oxyradical production in fish and bivalves, glutathione synthesis and utilization in channel catfish, antioxidant defense mechanisms in aquatic animals, mechanisms of genotoxicity in benthic fish, and biochemical effects of pulp and paper mill effluents and genotoxic sediments in freshwater fish.



Richard B. Forward, Jr., Ph.D., *Professor*; B.S., Biology, Stanford University; Ph.D., Biology, University of California, Santa Barbara.

Dr. Forward and his students investigate the behavior and physiology of estuarine and coastal zooplankton. This includes the photobehavior, photophysiology, biological rhythms, diurnal vertical migration, and horizontal migration of crustacean and fish larvae. Past studies have worked with crustaceans and

chaetognaths to determine the effects of temperature, salinity, and feeding on phototaxis and geotaxis, salinity perception, and polarized light perception. Field studies have looked at horizontal and vertical distributions as related to environmental factors. Additional studies involve rhythms in egg hatching by crustaceans. Types of rhythms, flexibility, and the involvement of peptide pheromones are being considered.

He is in residence at the Marine Laboratory.

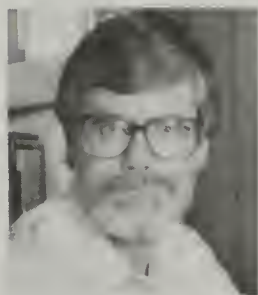


Jonathan H. Freedman, Ph.D., Assistant Professor; B.A., Microbiology, Rutgers University; M.S., Ph.D., Molecular Pharmacology, Albert Einstein College of Medicine.

Dr. Freedman's research is directed toward understanding the regulatory mechanisms controlling an organism's response to environmental stress. In particular, he is interested in how they are exposed to toxic concentrations of heavy metals. He is investigating these processes using the microscopic soil nematode, *Caenorhabditis elegans*, as a model system. *C. elegans* is archetypical for the study of development, signal transduction and gene regulation in a whole organism. Results from

this research will help elucidate how an organism adapts to an increasingly toxic environment.

A second area of his research focuses on understanding the mechanism of gene regulation of the metal-binding protein, metallothionein. Multiple factors—including those involved in metalloregulation, development, and cell specificity—must coordinately interact to activate metallothionein gene transcription. He is using *in vivo* techniques to monitor gene activity, RNA accumulation, and protein expression in individual cells within the nematode. As a result of this research, genetically engineered nematodes have been developed that may be used as biomonitors for environmental toxins.



Robert G. Healy, Ph.D., Professor; B.A., M.A., Ph.D., Economics, University of California, Los Angeles.

Dr. Healy works on land-use and environmental policy in the United States and developing countries. Before coming to Duke in 1986, he was senior associate at The Conservation Foundation/World Wildlife Fund in Washington, D.C. His past research has resulted in books on state land-use planning, coastal zone management in California, rural land markets, national forest policy, resource and environmental problems of agriculture, and environmental policy in developing countries. He has a continuing interest in land-use policy in fast

growing areas, particularly the U.S. South and rural areas affected by rapid migration or by tourism. Dr. Healy teaches courses on land-use and environmental policy and on conservation and sustainable development in the Third World.



Peter A. Howd, Ph.D., Assistant Professor; B.A., Geology and Economics, Williams College; M.S., Ph.D., Oceanography, Oregon State University.

Dr. Howd's studies focus on how waves and currents interact to determine the evolution of beach morphology. Research is currently being conducted in the description of low frequency (infragravity) waves in the surf zone, the temporal and spatial scales of beach profile variability, and processes leading to sediment exchange between the beach and inner continental shelf. This research is moving toward a quantita-

tive understanding of waves and currents in shallow coastal environments and the resulting evolution of beach morphology.

How rapid changes, related to individual storm events, are integrated through time is also a subject of study. Using more than ten years of data collected on a section of the North Carolina Outer Banks, this project is aimed at understanding how changing global weather patterns may alter the evolution of undeveloped shorelines.

He is in residence at the Marine Laboratory.



Julie A. Johnson, Ph.D., *Assistant Research Professor; B.A., Human Biology, Stanford University; Ph.D., Zoology, University of Edinburgh.*

Dr. Johnson's current research interests lie in two related areas: (1) sustainable development, and whether it can really be made to work; and (2) the contributions of science to natural resource policy, both the incorporation of natural science findings into policy, and the communication of policy information needs to researchers in the natural sciences. Of particular concern are countries coping with rapid population growth, and economic and political pressures that favor unsustainable use of resources.

Before coming to Duke, Dr. Johnson was a science fellow at the United States Agency for International Development. There, her concerns were environmental health, health policy, and the role of women in development, particularly with reference to natural resource use.



Gabriel G. Katul, Ph.D., *Assistant Professor; B.E., Civil Engineering, American University of Beirut; M.S., Civil Engineering, Oregon State University; Ph.D., Civil Engineering, University of California, Davis.*

Dr. Katul's research focuses on hydrology and fluid mechanisms in the environment. In particular, he is interested in heat and water transport in the vadose zone and its importance in characterizing surface layer turbulence. He has carried out many laboratory and field experiments to characterize the parameters of heat and momentum transport mechanisms across the land-atmosphere interface and to determine their relationship to the local and regional hydrologic budget.

Recent work has centered on various aspects of hydrology and environmental fluid mechanics such as (1) heat and momentum fluxes over complex watershed terrain, (2) heat and water movement in unsaturated field soils, (3) the structure of turbulence close to the land-atmosphere interface, and (4) the impact of hydrologic processes on the spatial structure of soil moisture content.



Robert O. Keohane, Ph.D., *James B. Duke Professor of Political Science, B.A., Social Sciences, Shimer College; Ph.D., Political Science, Harvard University.*

Dr. Keohane's research focuses on the role of international institutions, including international environmental regimes such as the Montreal Protocol on Substances that Deplete the Ozone Layer and organizations such as the Global Environment Facility. He is interested in the conditions under which such institutions form and gain membership and authority. His research is also designed to explore how such institutions can become effective in promoting concern about the environ-

ment, facilitating international environmental cooperation, and strengthening national environmental policies. A recent project, *Institutions for Environmental Aid* (ed. Keohane and Levy) explored the operation of institutions designed to promote environmental protection in poor countries by transferring resources from richer ones. His current research includes participation in a project on global environmental assessments, which is designed to explore the conditions that affect these exercises, and their effects on environmental policy and behavior. Professor Keohane's principal appointment is in political science and his office is in Perkins Library. He also works on other issues involving the roles played by institutions in American foreign policy and world politics more generally.



William W. Kirby-Smith, Ph.D., *Associate Professor of the Practice of Marine Ecology*; B.S., Biology, University of the South; Ph.D., Zoology, Duke University.

Dr. Kirby-Smith's research interests involve marine ecology and invertebrate zoology. His recent research projects include the following: (1) ecology of rock outcrop communities on the continental shelf; (2) effects of salt marsh modifications on plant, invertebrate, fish and bird communities; (3) influence of pine plantation drainage on water quality and benthic invertebrates in receiving estuarine headwaters; (4) effects of agricultural development upon hydrology, water quality and biology in estuarine headwaters; and (5) the fate of fecal coliform bacteria in storm water runoff and estuarine headwaters. Additional research interests include the physiology of suspension feeding and its ecological consequences in estuaries.

He is in residence at the Marine Laboratory.



Kenneth R. Knoerr, Ph.D., *Professor*; B.S.F., Forestry, University of Idaho; M.F., Forestry, Ph.D., Yale University.

Dr. Knoerr's research emphasizes investigations of the processes by which plants interact with the atmosphere. This research is approached from two perspectives. The first is the development of physical models for the plant-environment interaction. The second, in parallel with the modeling, is an extensive experimental effort to collect data on the gradients of radiation, wind, temperature, humidity, carbon dioxide and other environmental parameters that characterize the microclimate of forests.

His research group is involved in an intensive study to measure and model the characteristics of air flow within the forest. These models will increase the understanding of the turbulent exchange of gases between forest vegetation and the atmosphere, the diffusion patterns of disease spores and pollen within the forest, and the mechanisms by which forests remove aerosols from the atmosphere.

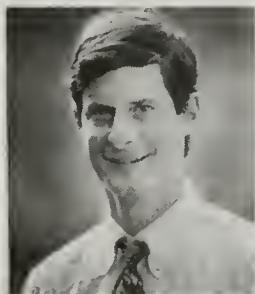


Randall A. Kramer, Ph.D., *Associate Professor*; B.A., Economics, University of North Carolina; M.E., Economics, North Carolina State University; Ph.D., Agricultural Economics, University of California, Davis.

Dr. Kramer's research interests are environmental economics, quantitative policy analysis, and sustainable development. Currently, the major focus of his research group is economic valuation of environmental quality. One such project in Madagascar is focusing on nature tourism, extraction of minor forest products, and deforestation-flooding interactions. Other research projects on economic valuation in the

United States include a study of air pollution damages to high elevation Appalachian forests and an assessment of Hurricane Hugo damage to wetland ecosystems and endangered species habitat.

Another area of research for Dr. Kramer is the economics of wetland policies. He has conducted studies for government agencies to examine factors influencing land-owners to convert wetlands and means of making government wetland policies more effective.



Douglas J. Lober, D.F., Assistant Professor; B.A., History, Yale University; M.B.A, Finance, Columbia University; M.F.S., Environmental Economics and Policy, D.F., Environmental Policy, Yale University.

Dr. Lober's research is in the areas of corporate environmental management and strategy and environmental and resource policy. He is primarily interested in understanding the "greening" of business. Specific research interests include the evaluation of corporate environmental performance, the analysis of corporate environmental reporting, applying organizational models such as the stakeholder model to understand corporate-environment interactions, examining multistakeholder collaborations between corporations and the not-for-profit sector, and developing and applying such paradigms and tools as industrial ecology, design for the environment, total quality environmental management, life cycle assessment, and product certification.

His policy interests involve air and waste management issues. Specific research projects include determining public attitudes toward source reduction, recycling, and the siting of waste disposal facilities. He has also studied the implementation of market-based environmental policies.



M. Susan Lozier, Ph.D., Assistant Professor; B.S., Chemical Engineering, Purdue University; M.S., Chemical Engineering, Ph.D., Oceanography, University of Washington.

Dr. Lozier's research interests lie in the general area of mesoscale and large-scale ocean dynamics. Specifically, she is interested in the Lagrangian aspects of ocean circulation, cross-frontal exchange processes and climate dynamics. Her approach to the study of these topics ranges from the application of numerical models to the analysis of observational data, with the focus on the testing and development of theory.

Currently, Dr. Lozier is studying the decadal variability of the North Atlantic Ocean, using historical hydrographic data from the period 1904 to 1990. A major objective of this work is to identify climatic anomalies during the past century and to determine the dynamics that govern their propagation. The Mediterranean outflow and the Labrador Sea are areas of particular interest. Current work is also focused on how local instabilities convolute a shelfbreak front and lead to mixing of shelf and slope waters.



Lynn A. Maguire, Ph. D., *Associate Professor of the Practice of Environmental Management; A.B., Biology, Harvard University; M.S., Resource Ecology, University of Michigan; Ph.D., Ecology, Utah State University.*

The major area of Dr. Maguire's current research is the application of formal techniques for decision making under uncertainty to the resolution of environmental conflicts. Decision analysis provides a framework for integrating scientific information from ecological theory and empirical studies with economic and public policy considerations affecting the management of natural resources.

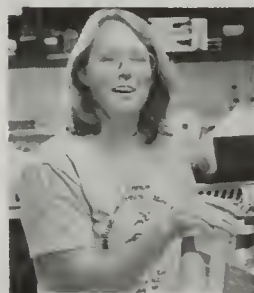
Using these techniques, Dr. Maguire and her students are studying multiple-use land management in southern Appalachian national forests and values of forested wetlands. Beyond these specific research projects, she is interested in (1) the application of population dynamics, population genetics and ecological theory to the conservation of animal and plant populations; (2) the use of decision analysis to resolve disputes in endangered species management and land-use planning; and (3) the use of quantitative methods to integrate scientific information in resource management.



Carol A. Mansfield, Ph.D., *Assistant Professor; B.A., Economics, Yale University; Ph.D., Economics, University of Maryland.*

Dr. Mansfield's research interests include the areas of environmental and public economics, with an emphasis on quantitative analysis. Her current research focuses on the use of contingent valuation surveys to price environmental resources and the individual decision-making processes. This work has two primary goals. The first is to evaluate how people react to hypothetical survey questions and whether their answers contain information that is useful to policy makers.

The second is to explore alternatives to the standard economic model of decision making and the implications for environmental policy. A secondary issue is the use of contingent value surveys to devise methods of compensating communities that agree to accept lower environmental quality, for example, allowing a landfill to be built in their area. In addition to this, she has begun research on the effect of environmental regulations on the location decisions of businesses.



Patricia D. McClellan-Green, Ph.D., *Assistant Research Professor; B.S., M.S., Biology, East Carolina University; Ph.D., Toxicology, North Carolina State University.*

Dr. McClellan-Green studies gene regulation and expression by aquatic organisms in response to xenobiotic exposure. Research is under way to determine the mechanism of PAH and PCB mediated gene regulation in fish. Other areas of interest include the identification and characterization of various cytochrome P-450s in aquatic organisms and the genetic regulation of select P-460 genes.

She is in residence at the Marine Laboratory.



Marie Lynn Miranda, Ph.D., *Assistant Professor of the Practice of Environmental Policy*; A.B., Economics and Mathematics, Duke University; M.A., Economics, Harvard University; Ph.D., Economics, Harvard University.

Dr. Miranda's primary research is in natural resource and environmental economics, with an emphasis on interdisciplinary, policy-oriented perspectives. Her research includes analysis of the institutional and economic factors that shape forest management practices, both in the United States and in the tropical developing world. She has worked in Indonesia, Malaysia, Nepal, Costa Rica, and Honduras. In addition, Dr.

Miranda carries out research to assess the effectiveness of market-based incentives and pollution prevention policies on the management of domestic solid waste. She teaches courses on American environmental policy, developing country environmental policy, environmental sciences and policy, and general microeconomics.



Michael K. Orbach, Ph.D., *Professor of the Practice of Marine Affairs and Policy*; B.A., Economics, University of California, Irvine; M.A., Ph.D., Cultural Anthropology, University of California, San Diego.

Dr. Orbach's research interests are in the application of social and policy sciences to coastal and ocean policy and management. His work uses a cultural, or human, ecology perspective to analyze human behavior in coastal and ocean environments. His current research projects include (1) the development and application of limited entry and effort management systems to marine fisheries; (2) the formation and

socioeconomic impact of marine minerals policy; (3) marine mammal and endangered species-fisheries conflicts; and (4) citizen involvement in coastal and ocean policy.

Dr. Orbach specializes in the application of science to the policy and management process. He is in residence at the Marine Laboratory.



Ram Oren, Ph.D., *Associate Professor*; B.S., Forest Resource Management, Humboldt State University; M.S., Ph.D., Forest Ecology, Oregon State University.

Dr. Oren's research examines ecological phenomena of plant interaction in relation to the environment. He is particularly interested in the nutritional dynamics of plants as affected by nutrient supply and demand. In tropical ecosystems, he studies the seasonal hydrological budget and the size and frequency of ecological groups.

In Germany, Dr. Oren's research on forest decline led him to construct a conceptual model of nutritional disharmony. The model describes the differential effects of imbalanced nutrition on plant growth and function. The model is being tested locally in pine and mixed pine-hardwood plantations. He is also testing the link between remotely-sensed data and ground measurements made in the Rio Bravo Reserve, Belize. The objective is to partition forest types into smaller stands of vegetation based on sets of ecophysiological characteristics and to quantify the effect of land-use alterations on the seasonal hydrological cycle.



Joseph S. Ramus, Ph.D., *Professor; A.B., Ph.D., Botany, University of California, Berkeley.*

Dr. Ramus's research includes the study of physical forcing of primary productivity in coastal plains estuaries. The research seeks a match between physiological response and the temporal frequency of physical drivers, the phasing of the organism with its environment. Another of Dr. Ramus's interests involves biotechnological research which includes extracellular polysaccharides produced by marine microphotoautotrophs. Two aspects are under investigation: (1) environmental regulation of carbon partitioning; i.e., the

diversion of newly fixed carbon from growth (new photosynthetic machinery) to disposable heteropolysaccharides (viscoelastic biopolymers), and (2) drag reducing properties of the biopolymers in pipe flow.

A third area under investigation is photoacclimation and photoinhibition in seaweeds and seagrasses. Of specific interest are macromolecular changes in the photosynthetic apparatus, the dynamic range of change and the effect of change on growth rate.

He is in residence at the Marine Laboratory.



Andrew J. Read, Ph.D., *Assistant Professor of the Practice of Marine Mammalogy; B.S., M.S., Ph.D., Zoology, University of Guelph.*

Dr. Read studies the life history and conservation biology of dolphins, porpoises, and other marine mammals. He conducts life history research through longitudinal studies of individuals in coastal populations and cross-sectional studies of samples from strandings or incidental catches in commercial fisheries. In these studies, he focuses attention on how animals partition energy among the competing demands of growth, maintenance and reproduction.

He also examines the impacts of human activities on populations of marine mammals and attempt to find solutions to such conflicts. In particular, he studies the effects of removals from populations caused by incidental mortality in commercial fisheries. This work is multifaceted and involves examination of animal behavior around nets, modification of fishing gear to minimize mortality, and demographic analyses of the effects of incidental catches.

He is in residence at the Marine Laboratory.

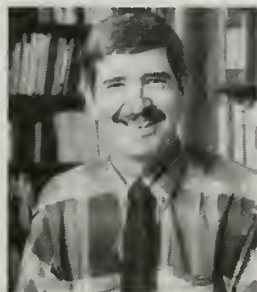


Kenneth H. Reckhow, Ph.D., *Associate Professor; B.S., Engineering Physics, Cornell University; M.S., Ph.D., Environmental Science and Engineering, Harvard University.*

Dr. Reckhow's research activities have focused on the development, evaluation, and application of models for the management of water quality. In particular, he is interested in the effect of uncertainty on model specification, parameter estimation, and model applications. Recent work has expanded this theme to consider the effect of scientific uncertainties on water quality decision making.

Among the problems that Dr. Reckhow's research group has examined are lake eutrophication, toxic substances, and acid rain. Past work on eutrophication has centered on the development and evaluation of empirical models, estimation of prediction uncertainty using first order error analysis and Monte Carlo simulation, and a decision analytic approach to lake management. Current work by Dr.

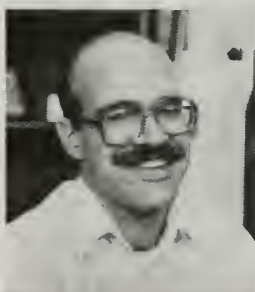
Reckow and his students concerns errors-in-variables and parameter identification in mechanistic models.



Curtis J. Richardson, Ph.D., *Professor*; B.S., Biology, State University of New York at Cortland; Ph.D., Ecology, University of Tennessee.

Dr. Richardson's research interests in applied ecology center on long-term ecosystem response to large-scale perturbations such as acid rain, toxic materials, flooding, or nutrient additions. He has specific interests in wetland ecosystems, phosphorus nutrient dynamics, and the effects of environmental stress on plant metabolism and growth. Major research focuses on wetlands as nutrient sinks.

His current research activities include: (1) the effects of nutrient additions and hydrology on Everglades phosphorus retention and community changes; (2) heavy metal sorption, storage and removal from drained pocosin peatlands; (3) wetland development trends in the southeastern United States; and (4) mechanisms for iron and manganese removal in constructed wetlands used for the improvement of coal mine drainage.



Daniel D. Richter, Ph.D., *Associate Professor*; B.A., Philosophy, Lehigh University; Ph.D., Forest Soils, Duke University.

Dr. Richter's research objectives are centered on understanding and quantifying soil change that is affected by long-term forest development and land use. His work is directed at quantifying how nutrient and hydrologic cycles control the chemistry of forest soils, drainage waters and forest productivity. His scientific interests in these topics are motivated by a desire to improve the management of soil-plant-watershed systems to support long-term human use. The responses of poorly buffered soils are of most interest, most particularly extremely weathered, acidic Ultisols that

are common to the southeastern United States and to the forests of the humid tropics. His research objectives are pursued both individually and cooperatively with scientists from several disciplines. His primary educational objectives are to help students develop an understanding of and appreciation for ecological functions of soil and forest ecosystems through lectures, seminars, field trips, and indoor and outdoor laboratories.



Daniel Rittschof, Ph.D., *Associate Professor*; B.S., Ph.D., Zoology, University of Michigan.

Dr. Rittschof's research interests involve chemical communication systems. His studies include external and internal molecular mediation of behavior (chemical ecology). At present, test systems are marine and include crustaceans (true crabs, hermit crabs and barnacles), molluscs and fish. Studies span the gamut from practical (nontoxic antifouling coatings, fish foods and fish feeding stimulants) to purely basic (larval release pheromones, designer peptides with biological activity, hermit crab shell attractant cues, hormonal control of feeding behavior, and enzymatic

activities in crustacean and gastropod saliva). The driving theme of the work is the evolution of chemical communication systems and their components.

He is in residence at the Marine Laboratory.



John T. Sigmon, Ph.D., *Associate Professor of the Practice of Environmental Science; A.B., Chemistry, Ph.D., Forest Meteorology, Duke University.*

Dr. Sigmon's research has focused on surface-atmosphere interactions over complex terrain with an emphasis on chemical transformations and deposition. One component of this research has addressed the linkages between surface layer processes and the larger scale flows in the planetary boundary layer.

Currently, Dr. Sigmon is working on a research project attempting to identify and quantify the non-methane hydrocarbons emitted from various types of tree species and the development of methods for field measurements of these compounds.



V. Kerry Smith, Ph.D., *Arts and Sciences Professor of Environmental Economics, A.B., Ph.D., Economics, Rutgers University.*

Dr. Smith's research interests are in environmental economics and applied microeconometrics. His current research involves the use of different methods to measure the economic value of nonmarketed environmental resources, such as the use of random utility models to describe recreation demand, hedonic models for coastal amenities, and contingent valuation surveys to estimate the values people place on cleaning up or improving environmental resources.

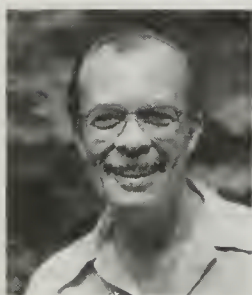
Another area of research involves incorporating environmental resources into computable general equilibrium models of economies. Two applications involve air pollutants in the European Community and coastal water related resources in the southeastern United States. Dr. Smith's research focuses on modeling how individuals deal with risks (including radon, pesticide residues and cholesterol) that differ in their temporal effects and prospects for mitigation. Other projects investigate the development of recreation values for reducing marine pollution, the measurement of the trade consequences of environmental policy, the incorporation of nonmarket services into measures of GDP, and the calibration of nonmarket valuation methods.



Laura K. Snook, Assistant Professor of the Practice of Conservation Biology and Director of the Duke/TNC Program in Applied Conservation Biology; B.A. History, Grinnell College; M.F.S., Doctor of Forestry, Yale University.

Dr. Snook is primarily interested in the application of ecological knowledge to the management and conservation of forests. Her research has focused on forest stand dynamics, disturbance ecology, and silviculture as well as social forestry and forest conservation. She has worked in highland (fir and pine), montane, and lowland tropical forests in Mexico, and has ongoing research projects in the mahogany forests of Mexico,

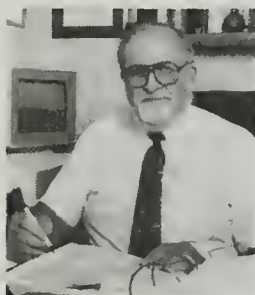
Belize, and Brazil. Within The Nature Conservancy, her role consists of carrying out and facilitating research to answer questions applicable to ecosystem management on TNC landholdings, with the participation of Duke NSOE students and faculty. She is also working with TNC to evaluate and enhance the potential of socially and economically viable forestry to sustain biodiversity. In the southeastern United States, her work will focus on the longleaf pine ecosystem and the forests of the Roanoke River floodplain.



John Terborgh, Ph.D., *James B. Duke Professor; B.S., Biology, M.S., Ph.D., Plant Physiology, Harvard University.*

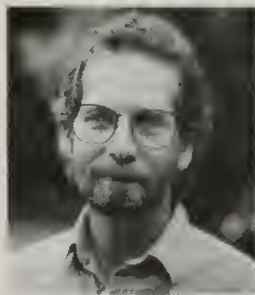
Dr. Terborgh's interests lie in the fields of tropical ecology and conservation. At different times in his career he has studied birds, primates, herbs, and forest trees, and has directed student projects involving butterflies, lizards, amphibians, and crocodilians. The common denominator in all this work has been the goal of solving problems of general ecological interest using a comparative approach. Some typical comparisons have involved seasonal patterns in resource utilization by forest primates, habitat use by Amazonian birds, and latitudinal variation in the structure of mature forests.

Applications of ecology to conservation have increasingly become a central theme of his work. He regards as particularly important the need to understand the many consequences of habitat fragmentation, especially those related to the disruption of trophic level processes.



Jerry J. Tulis, Ph.D., *Adjunct Associate Professor; B.S., Bacteriology, University of Illinois; M.S., Medical Microbiology, Loyola University; Ph.D., Radiobiology, Catholic University of America.*

Dr. Tulis is primarily interested in the detection, amelioration, and prevention of adverse health effects in the occupational and environmental setting as a result of exposure to biohazardous agents and materials. Specifically, he is interested in (1) the improvement of indoor environments from the viewpoint of bioaerosols, including the identification and control of harmful aerosols composed of opportunistic and pathogenic microorganisms, biological toxins, and allergens; (2) the mitigation of hazardous waste using bioremediation technology; (3) research on the development of biocidal materials; (4) the development of preventive measures to limit zoonotic infections in various zoologic and field operations; and, (5) the control of mycotoxin production resulting from the growth of various saprophytic fungi in the agricultural setting. His current research involves studies on the growth-promoting potential of fungal contaminants of fiberglass duct lining and duct board, and nationwide risk assessment studies for the EPA on occupational and environmental biohazards in various workplaces, including laboratories, Superfund sites, and marine operations.



Dean L. Urban, Ph.D., *Assistant Professor; B.A., Botany and Zoology, M.A., Wildlife Ecology, Southern Illinois University; Ph.D., Ecology, University of Tennessee.*

Dr. Urban's research interest is in landscape ecology: the development and implications of landscape pattern. He uses simulation models to explore the interplay of abiotic environmental templates (temperature, moisture gradients), biotic processes (plant demography, competition, dispersal), and disturbances (including human land use) in governing forest dynamics in mountain landscapes. One current project uses a model as a framework for comparisons among forests in the Oregon Cascades, the Sierra Nevada of California, the White Mountains of New Hampshire, and the southern Appalachians of North Carolina.

Building on his work in forests, Dr. Urban is also interested in wildlife communities in patchy landscape mosaics. His focus is on how landscape pattern and metapopulation

processes interact to generate landscape-scale patterns in biodiversity. One emphasis of this research is to use models, interfaced with geographic information systems, to explore alternative forest management strategies.

Extended Faculty

S. Marshall Adams, Ph.D., *Adjunct Professor*; B.S., Wildlife Biology, M.S., Zoology, North Carolina State University; Ph.D., Marine Science, University of North Carolina at Chapel Hill.

Dr. Adams is principal investigator of several large projects at Oak Ridge National Laboratory related to effects of environmental stress on aquatic ecosystems. His research interests are in the general areas of environmental impact assessment and biological indicators of aquatic ecosystem health.

Frederick W. Cubbage, Ph.D., *Adjunct Professor*; B.S., Forestry, Iowa State University; M.S., Forest Policy, Ph.D., Forest Economics, University of Minnesota.

Dr. Cubbage is professor of forestry and director of the forestry program in the College of Forest Resources at North Carolina State University. His primary research interests are the regulation of private forest landowners, timber production and harvesting economics, timber supply modeling, and forest policy issues.

Alexander T. Davison, M.F., *Lecturer*; B.S., Botany, M.F., Forest Entomology, Duke University.

A consultant in forest land management, Mr. Davison is interested in the use of aerial photographic interpretation to trace land-use history, facilitate forest management, and increase the efficiency of forest inventory. He is also interested in small, private timberland ownerships, particularly in problems involving the enhancement of forestry and wildlife management.

Michael P. Dieter, Ph.D., *Adjunct Professor*; B.S., University of Notre Dame; M.A., Ph.D., Zoology, University of Missouri.

Dr. Dieter is a physiologist and science editor for *Environmental Health Perspectives* at the National Institute of Environmental Health Sciences. His research interests lie in the area of environmental toxicology of metals, mammalian toxicology and carcinogenesis, and cellular biochemistry and physiology.

George R. Dubay, Ph.D., *Adjunct Assistant Research Professor*; B.S., Chemistry, Fairfield University; Ph.D., Physical Organic Chemistry, Duke University.

Director of instrument operations in Duke's chemistry department, Dr. Dubay is interested in mass spectrometry methods to identify and quantitate environmental contaminants and biochemically interesting compounds.

David S. Ellsworth, Ph.D., *Adjunct Assistant Professor*; B.S., Biological Sciences, Cornell University; Ph.D., Forestry, University of Wisconsin, Madison.

Dr. Ellsworth currently participates in research in the Duke Forest concerning the physiological effects of carbon fluxes on pines under ambient and elevated inputs of carbon dioxide. He is a plant physiologist in the biosystems and process sciences division of Brookhaven National Laboratory, Upton, Long Island, N.Y.

Craig C. Freudenrich, Ph.D., *Assistant Research Professor*; B.A., Biology, West Virginia University; Ph.D., Physiology, University of Pittsburgh.

Dr. Freudenrich is interested in the control, modulation, and regulation of cellular ion homeostasis and how environmental pollutants can alter ion homeostasis, thereby affecting cell function. He is currently developing a cell culture model of the barnacle mineralizing epithelium that will be useful for investigating the cellular ion transport mechanisms of biomineralization and the influence of the environment (for example, environmental pollutants and heavy metals) on barnacle growth and development.

Milton S. Heath, Jr., J.D., *Adjunct Professor; A.B., Harvard University; LL.B., J.D., Columbia University.*

Dr. Heath specializes in environmental and natural resource law and administration, and the legislative and other governmental aspects of resource development. He is a member of the Institute of Government faculty at the University of North Carolina.

George R. Hendry, Ph.D., *Adjunct Professor; B.A., Zoology, M.S., Water and Air Resources, Ph.D., Limnology, University of Washington.*

Dr. Hendry is head of the Biosystems and Process Sciences Division at Brookhaven National Laboratory and codirector of the Forest-Atmosphere Carbon Transfer and Storage (FACTS) project operating in the Duke Forest. His primary research interests are in ecology and the development of integrated field experiments for ecosystem analysis.

Marjorie M. Holland, Ph.D., *Adjunct Associate Professor; A.B., Botany, Connecticut College; M.A., Ecology, Smith College; Ph.D., Botany, University of Massachusetts, Amherst.*

Dr. Holland is chief of the integration and assessment team of the Environmental Protection Agency's Environmental Monitoring and Assessment Program (EMAP) Center at Research Triangle Park, N.C. Her research interests are in the areas of wetlands ecology, plant ecology and systematics, water resource management and policy development, and environmental assessments.

Thomas P. Holmes, Ph.D., *Adjunct Assistant Professor; B.S., M.S., Agricultural Economics, University of Connecticut; Ph.D., Economics, Ohio Wesleyan University.*

Dr. Holmes is a research forester with the USDA Forest Service's Economics of Forest Protection and Management work unit at Research Triangle Park, N.C. His research focuses on the application of nonmarket valuation methods to problems of forest ecosystem protection and conservation in the United States and Brazil.

Michael Lavine, Ph.D., *Associate Professor; B.S., Mathematics, Beloit College; M.S., Mathematics, Dartmouth College; Ph.D., Statistics, University of Minnesota.*

Dr. Lavine has joint appointments at Duke in statistics and the environment. His primary research interests are in robust and nonparametric Bayesian statistical theory and environmental statistical applications.

E. Ann LeFurgey, Ph.D., *Adjunct Associate Research Professor; B.S., Biology, Chemistry, Maryville College; M.S., Ph.D., Marine Sciences, University of North Carolina, Chapel Hill.*

Director of the analytical electron microscopy facility in Duke University Medical Center's Department of Cell Biology, Dr. LeFurgey is a cell physiologist with interest in the mechanisms of toxic injury in cells elicited by metals and organic pollutants. Her laboratory is one of few worldwide focusing on the application of quantitative electron probe x-ray microanalysis and imaging to problems in environmental health and toxicology.

D. Evan Mercer, Ph.D., *Adjunct Assistant Professor; B.S., Biology, B.S., Zoology, University of Texas; M.S., Forest Ecology, University of Michigan; Ph.D., Natural Resource Economics, Duke University.*

Dr. Mercer is a research economist with the USDA Forest Service's Southern Research Station at Research Triangle Park, N.C. His current research interests are the economics of agroforestry; nonmarket valuation; rural development; and the effects of government policies, market factors, and societal values on the management and protection of tropical forest resources.

Orrin H. Pilkey, Ph.D., *James B. Duke Professor of Coastal Geology*; B.S., Geology, Washington State University; M.S., Geology, Montana State University; Ph.D., Geology, Florida State University.

A professor in the geology department at Duke, Dr. Pilkey studies applications of the principles of coastal geology to developed shorelines and barrier islands. This includes impact of engineering structures and procedures on recreational beaches and determining the feasibility of various alternative responses to shoreline retreat related to rising sea level.

Stuart Rojstaczer, Ph.D., *Assistant Professor*; B.S., Geology, University of Wisconsin; M.S., Geology, University of Illinois; Ph.D., Applied Earth Sciences, Stanford University.

Associate professor in the Department of Geology at Duke, Dr. Rojstaczer is a hydrogeologist. His primary research interest is in the interaction between crustal deformation and subsurface fluid flow. He is also involved in developing new methods to measure the permeability of the earth's crust in situ at a variety of scales.

William H. Schlesinger, Ph.D., *Professor*; A.B., Biology, Dartmouth College; Ph.D., Ecology and Systematics, Cornell University.

Dr. Schlesinger's research interests span the field of global change science, focusing on human induced changes in the global biogeochemical cycles. He maintains an active program of field research in the southwestern United States, where he examines the causes and consequences of desertification in arid-land ecosystems.

Narendra P. Sharma, Ph.D., *Adjunct Professor*; B.S., Agricultural Economics, University of Hawaii; M.S., Agricultural Economics, Rutgers University; M.E.M., Environmental Management, Duke University; Ph.D., Agricultural Economics and Economic Development, Virginia Polytechnic Institute and State University.

Principal economist at the World Bank in Washington, D.C., Dr. Sharma is the primary author of the bank's forest policy. His research interests are in applied economics, project design and policy analysis. He has worked in developing countries on policy issues related to conservation and sustainable development, poverty, natural resource management, and policy dialogue. His current research focuses on quantification of environmental impacts and local participation.

Harold Karl Steen, Ph.D., *Adjunct Professor*; B.S., Forestry, M.F., Ph.D., History of Conservation, University of Washington.

Dr. Steen's current research interests are the political and economic development of modern forestry concepts and policies, and the history of conservation and land use as related to current forest land issues. He is director of the Forest History Society at Duke University.

Panchabi Vaithianathan, Ph.D., *Assistant Research Professor*; B.S., M.S., Geology, Ph.D., Environmental Science, Jawaharlal Nehru University.

Dr. Vaithianathan's research activities have focused on understanding the biogeochemical cycling of nutrients and trace metals in aquatic systems. He has carried out laboratory and field research in Indian rivers, Chesapeake Bay estuaries, Canadian shield lakes, and floodplains of the Parana River and the Florida Everglades. His recent work has centered on the impacts of agricultural runoff on the nutrient dynamics in the Everglades. He is a senior scientist at the Duke Wetland Center laboratory in Florida.

John J. Vandenberg, Ph.D., *Adjunct Assistant Professor*; B.A., Biology, The College of Wooster; M.S., Ph.D., Biophysical Ecology, Duke University.

Dr. Vandenberg's current research interests are in health risk assessment methodology and application and the evaluation of risk assessment techniques for hazardous air pollutants. He is director of the Research to Improve Health Risks Assessments program in the Office of Research and Development, United States Environmental Protection Agency, Research Triangle Park, N.C.

Carel P. van Schaik, Ph.D., *Associate Professor*; B.S., Biology, M.S., Ethology and Plant Ecology, Ph.D., Ethology, Utrecht University.

Dr. van Schaik is a tropical ecologist and ethologist with Duke's Department of Biological Anthropology and Anatomy. His ecological research focuses on fungivores in tropical rain forests and their response to resource seasonality and disturbance. He is also interested in strategies of conserving biological diversity.

P. Aarne Vesilind, Ph.D., *Professor*; B.S., M.S., Civil Engineering, Lehigh University; M.S., Sanitary Engineering, Ph.D., Engineering, University of North Carolina at Chapel Hill.

A professor in Duke University's School of Engineering, Dr. Vesilind researches wastewater and sludge management and disposal, and the development of solutions to solid waste and resource recovery problems.

David N. Wear, Ph.D., *Adjunct Assistant Professor*; B.A., Botany, University of Montana; M.F., Resource Systems Science, Duke University; Ph.D., Forest Economics, University of Montana.

Dr. Wear's current research concerns the economics of ecosystem management, the design of forestry policies, and the regional assessment of forest production and investment. He is project leader for the economics of forest protection and management with the USDA Forest Service, Southeastern Forest Experiment Station, Research Triangle Park, N.C.

Jonathan B. Wiener, J.D., *Associate Professor*; A.B., Economics, Harvard College; J.D., Harvard Law School.

A member of the Duke law school faculty, Mr. Wiener is interested in the interplay of science, economics, and law in addressing environmental and human health risks. Before coming to Duke, he worked in the area of environmental policy at the White House Council of Economic Advisers and Office of Science and Technology Policy, and at the United States Department of Justice. He also helped organize the environmental component of the "Americorps" national service program.

Robert L. Wolpert, Ph.D., *Associate Professor*; A.B., College Scholar, Cornell University; Ph.D., Mathematics, Princeton University.

A member of Duke's Institute of Statistics and Decision Sciences, Dr. Wolpert is interested in the theory and foundations of statistical inference and in the application of advanced mathematical, numerical and statistical methods to the modeling and study of environmental and biological systems. His current research stresses the study of model selection, model validation, and uncertainty analysis for environmental simulation and risk-assessment models.

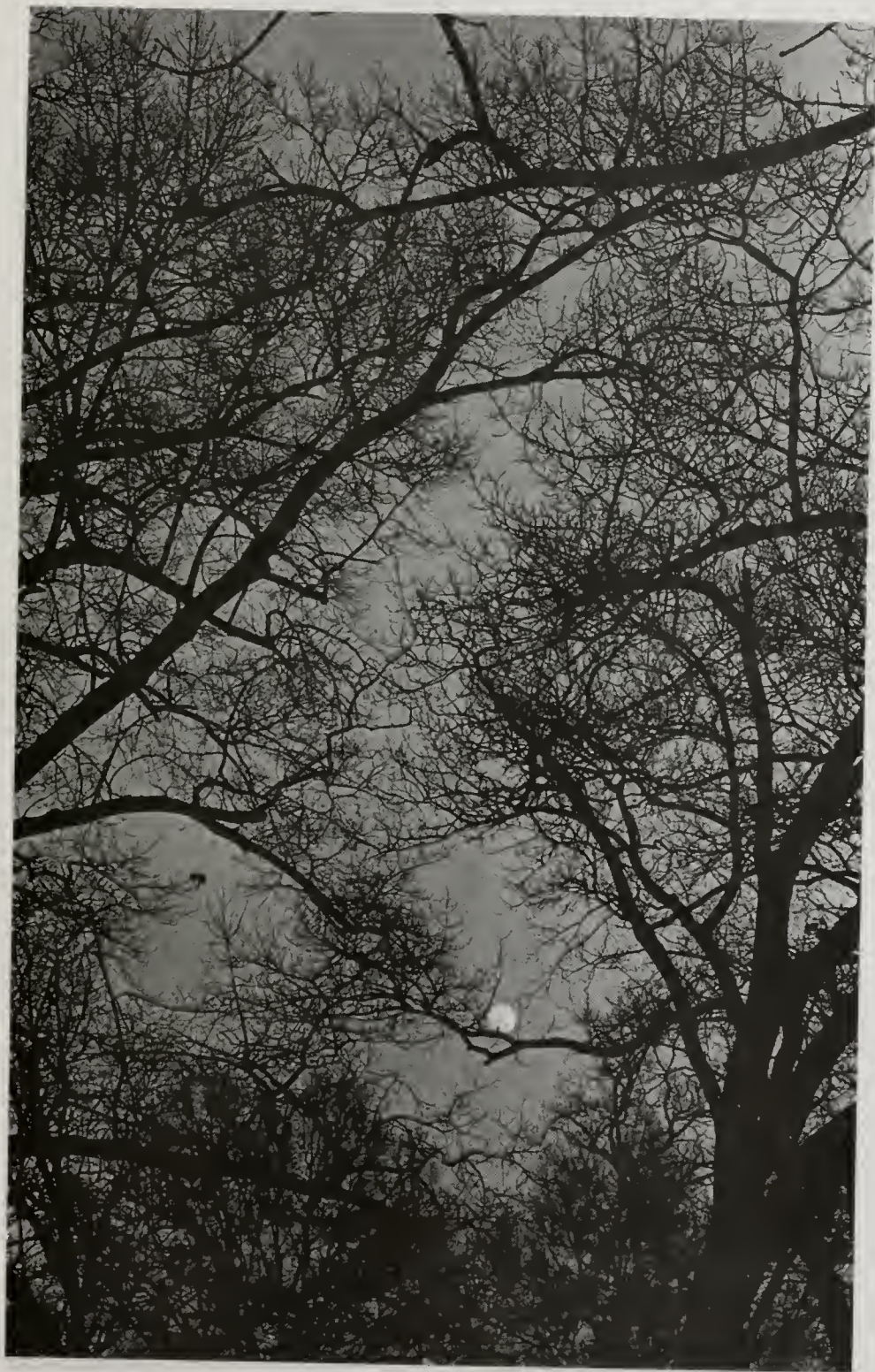
Reiner Zimmerman, Ph.D., *Adjunct Assistant Professor*; Adjunct Assistant Professor; B.S., Botany, M.S., Ecology and Biogeography, Ph.D., Physiological Plant Ecology, University of Bayreuth, Germany.

Dr. Zimmermann is a member of technical staff at the Jet Propulsion Laboratory/California Institute of Technology in Pasadena. His primary research interests are comparative studies of water use by vegetation along a latitudinal gradient from boreal to tropical forest types and the relationships between dielectric properties, tree water status canopy structure, and its detection with Synthetic Aperture Radar.

Faculty Emeriti

Roger F. Anderson, Ph.D., *Professor Emeritus*
Cazlyn G. Bookhout, Ph.D., *Professor Emeritus*
John D. Costlow, Ph.D., *Professor Emeritus*
George F. Dutrow, Ph.D., *Professor Emeritus*
John W. Gutknecht, Ph.D., *Professor Emeritus*
Benjamin A. Jayne, Ph.D., *Professor Emeritus*
James Granville Osborne, B.S., *Professor Emeritus*
William R. Sizemore, Ph.D., *Professor Emeritus*
William J. Stambaugh, Ph.D., *Professor Emeritus*
James G. Yoho, Ph.D., *Professor Emeritus*





Degrees and Programs of Study



Degrees

Duke University offers undergraduate, professional, and research programs in several areas of study related to natural resources and the environment. A Bachelor of Arts degree with a major in environmental sciences and policy is offered through Trinity College of Arts and Sciences. Master of Environmental Management (M.E.M.) and Master of Forestry (M.F.) degrees are offered by the Nicholas School of the Environment; and the Ph.D. degree is offered in the Department of the Environment of the Graduate School. The Master of Arts (A.M.) is available through the Graduate School for individuals wishing to pursue graduate study in the environment in conjunction with a J.D. degree in the School of Law. Students generally are not admitted to the Department of the Environment as candidates for a terminal Master of Science (M.S.) degree; however, the M.S. may be awarded as part of a doctoral program.

The Distinction between Professional and Graduate Degrees. The degrees offered through the Nicholas School of the Environment (M.E.M. and M.F.) are *professional* degrees. They are intended mainly to provide students with the broad education and experience necessary for careers in natural resource and environmental management. The professional degrees emphasize applied science, economics, policy, and quantitative methods of problem analysis and decision making.

The Master of Environmental Management degree is designed to develop expertise in planning and administering the management of the natural environment for maximum human benefit with minimum deterioration of ecosystem stability. M.E.M. degree candidates choose one of six programs of study: Biohazard Science; Coastal Environmental Management; Environmental Toxicology, Chemistry and Risk Assessment; Resource Ecology; Resource Economics and Policy; or Water and Air Resources.

The Master of Forestry degree concentrates on forest and associated resources, including timber, water, wildlife, and recreation and their management from an ecological and economic point of view. The graduate with an M.F. degree is qualified for employment as a professional forester in an administrative or staff position with federal and state agencies, industries, consulting firms, and other organizations concerned with forest and land management. The Forest Resource Management program is offered under the M.F. degree. This program is accredited by the Society of American Foresters.

Students planning careers primarily in teaching and research are urged to follow a course of study in the Graduate School. The *graduate* degrees (A.M., M.S., Ph.D.) are appropriate for students desiring to concentrate their study and research within a well-defined subject area. Students usually pursue fewer and more advanced topics to a greater depth than do students in professional degree programs. Graduate School students emphasize research as major parts of their degree programs. An active research program is a vital component of the Nicholas School of the Environment, and most of the research projects in the school utilize Ph.D. candidates as research assistants. The prospective Ph.D. student should consult the bulletin of the Graduate School for more detailed information.

Individually designed programs of study related to natural resources and the environment are possible under either the professional or graduate degrees, with faculty approval.

Requirements for the Professional Degrees

A total of 48 units is required for either the Master of Environmental Management (M.E.M.) or the Master of Forestry (M.F.) degree. Although a student may fulfill part of the degree requirements through an internship or independent study off campus, he or she must complete at least 36 units and three semesters in residence and pay full tuition for the fourth semester. Transfer credit is not accepted. With advisor approval, students may count up to 6 credits of Duke undergraduate course work toward their degree requirements.

Students' programs consist of a combination of regular courses, independent projects, and seminars. A master's project of 4 to 6 units is required of all students. Course work in other departments of the university and at nearby institutions is available to strengthen students' education in special areas.

A full semester load is 12 units, which should ordinarily consist of a combination of regular courses, independent projects, and the master's project. Not more than four regular courses should be taken in a semester. Permission of the student's adviser is required to take more than 15 or fewer than 9 units in a semester.

As students progress in their programs, they are expected to devote an increasing amount of time to the master's project and to register for more independent project units in a semester. Thus, the student should plan to take fewer units of regular courses during the latter semesters of study.

ONE-YEAR MASTER OF FORESTRY OPTION

Students who have an undergraduate degree in forestry may earn a Master of Forestry degree with only 30 units of credit. To be admitted to the one-year degree option, the student must have received a Bachelor of Science in Forestry degree from an accredited forestry school. The student must spend a minimum of two semesters in residence.

SPECIAL DEGREE TRACK FOR PRACTICING PROFESSIONALS

The Nicholas School of the Environment offers a special professional master's degree track, through the Senior Professional Program, that allows a reduced term of residency.

Candidates with at least five years of work experience in an environmental field may be admitted to the Nicholas School of the Environment as part-time students. These professional degree candidates must spend one semester at Duke enrolled in regular, graduate level courses. Up to 15 units of credit are taken during this time. The remaining 15 or more units of credit required for a Master of Forestry or Master of Environmental Management degree may be earned through continuing education intensive courses, independent study, and a master's project. Candidates have five years from the date of acceptance to complete the credit requirements.

Specific degree requirements for students in the Senior Professional Program, including required courses and the number of academic units necessary to complete the degree, are established by the education committee upon evaluation of the individual's previous education, work experience, and career goals.

Concurrent Degrees

Master of Environmental Management and Master of Forestry. Students desiring to earn both the M.E.M. and the M.F. degree can do so by planning their courses appropriately. The requirements for earning both degrees are as follows:

1. The student must qualify for either the M.E.M. or M.F. degree by earning 48 units of credit under the requirements set forth above.
2. For the second degree, the student must complete an additional 24 units of study composed of courses that would normally be accepted toward the second degree. Two additional semesters in residence are normally required, although, with careful planning, the student may complete both professional degrees in a total of five semesters.

Determination of eligibility for the degrees will be made on an individual basis and will consider the educational background and objectives of the student.

Master of Business Administration. The techniques of management science are applied with increasing frequency in the management of natural resources, and they are also now commonly used in the analysis of environmental problems. To integrate training in these management techniques more effectively into the curriculum, the Nicholas School of the Environment has developed a cooperative arrangement with Duke's Fuqua School of Business. Three years of study are required to earn the combined degrees of Master of Environmental Management/Master of Business Administration or Master of Forestry/Master of Business Administration. Normally, at least 36 units of credit within the school are required to receive the M.E.M. or M.F. degree. A typical program sequence would involve spending the first year in the Nicholas School of the Environment followed by a year in the Fuqua School of Business and concluding with the final year of combined work in both schools.

These concurrent degrees stress concepts, analytical reasoning, and the basic methodologies of management science, while providing the student with a knowledge of current problems in the natural resource industries. Managerial economics, resource economics, organization theory and management, accounting, information and control, resource management, the legal environment, and public policy aspects of resource industries form a substantial component of each degree.

Because of the academic demands of these degrees, those entering without the necessary analytical skills or life science background may be required to take additional work beyond that specified.

Students who wish to undertake both the Master of Environmental Management or Master of Forestry and Master of Business Administration degrees must apply to and be accepted by each of the respective schools. For information on the Master of Business Administration degree, the prospective student should write to the Fuqua School of Business, Admissions Office, Duke University, Box 90104, Durham, N. C. 27708-0104.

Master of Public Policy. As issues concerning natural resources and the environment have become of increasing significance to the nation, there has developed a corresponding need for well-trained policy analysts who can provide timely and appropriate information and analysis to resource policy makers. To meet this need a unique concurrent degree has been developed in cooperation with the Terry Sanford Institute of Public Policy. Students pursue a Master of Environmental Management or Master of Forestry degree and a Master of Public Policy. Doctoral candidates in forestry and the environmental sciences are also eligible to undertake the Master of Public Policy.

The concurrent degree takes two and one-half years to complete. The first year is typically devoted to study in the Nicholas School of the Environment, and the second year is typically spent in the Institute of Public Policy. The final semester involves work in the Nicholas School. Normally, at least 36 units of credit within the school are required to receive the M.E.M. or M.F. degree. A summer internship with a resource or environmental agency, or with a related legislative, judicial, or interest group, is required for the policy degree.

This degree provides training in the politics and economics of resource and environmental policy making. Emphasis is placed on understanding the social and political

forces involved, developing facility with quantitative and logical methods of forecasting, and evaluating policy consequences. Knowledge of the uses and limitations of policy analysis and an awareness of the ethical dimensions of policy choice are also stressed.

Students must apply to and be accepted by both the Nicholas School of the Environment and the institute. For detailed information on the public policy degree, write to Director of Graduate Studies, Terry Sanford Institute of Public Policy, Duke University, Box 90240, Durham, N. C. 27708-0240.

Juris Doctor in Environmental Law. Environmental and natural resource issues increasingly require legal and regulatory knowledge for resolution. There is a growing demand for resource managers and scientists who have legal credentials; similarly, attorneys are facing more situations in which knowledge of natural resources and the environmental sciences is critical to the resolution of disputes. To satisfy these demands, the Nicholas School of the Environment and the School of Law have developed a cooperative arrangement to allow pursuit of concurrent Master of Environmental Management or Master of Arts and Juris Doctor degrees.

For students in the concurrent M.E.M./J.D. program, the Nicholas School of the Environment requires 36 units of credit to be taken within its own programs and allows 12 units of credit for courses taken in the law school. The School of Law requires 74 units of law credit and awards 12 units for work done in the Nicholas School of the Environment.

Typically, a student will complete the first year of study in the School of Law and the second in the Nicholas School of the Environment. During the third and fourth years, the student will take a combination of courses in both schools. M.E.M./J.D. candidates must apply to and be accepted by both the Nicholas School of the Environment and the School of Law.

For students in the concurrent A.M./J.D. degree, 24 units of credit are required in the Department of the Environment of the Graduate School and 74 units in the School of Law. Further information is available from the director of graduate studies.

For information on the law degrees, prospective students should write to the School of Law, Admissions Office, Duke University, Box 90393, Durham, N. C. 27708-0393.

Other Concurrent Degrees. With the special permission of the education committee and the dean of the Nicholas School of the Environment, students are permitted, on an individual basis, to establish concurrent degree programs with certified graduate degree programs either within or outside of Duke University. In the past, students have designed such programs with law schools, business schools, and graduate engineering programs. As with the other concurrent degrees, the student must be enrolled in the Master of Environmental Management or Master of Forestry degree program for 36 units of credit and in residence for at least one full year.

To gain acceptance of a specially designed concurrent degree, the student must show an official acceptance from another certified graduate degree program. In order to receive the M.E.M. or M.F. degree, the student must have completed 36 units of credit, the master's project, all program area requirements, and at least one full year of study in the other degree program (with an official transcript of work completed). For additional information concerning special concurrent degrees, applicants should consult the Office of Enrollment Services.

Graduate Degrees

The Doctor of Philosophy (Ph.D.) degree in disciplines related to forestry, environmental studies, and the marine sciences is administered by the Graduate School of the university; however, the bulk of the instruction, research, and advising connected with it takes place in the Nicholas School of the Environment. Policy and procedures for admission, general requirements for degrees, registration, and academic regulations are given in detail in the bulletin of the Graduate School and are not repeated here. In

general, procedures, requirements, and regulations are similar in the Graduate School and in the Nicholas School of the Environment. Some differences are noted below.

Qualification of Students. Students seeking admission to the Graduate School must have received an A.B. or B.S. degree (or the equivalent in the case of foreign students) from an accredited institution. Usually the student should have majored in the area of intended graduate study or one closely related to it. Some work in science and mathematics is essential; however, the total undergraduate education should be well-rounded. Because research is such an integral part of graduate education and of the school's mission, the student's undergraduate record must evidence the capability and motivation to carry out independent study and research at an advanced level.

Admission. Applications for admission to Ph.D. degree programs should be obtained from and returned to the dean of the Graduate School, Duke University, Box 90063, Durham, N. C. 27708-0063. However, inquiries about programs of study and research should be sent to the Office of Enrollment Services, Nicholas School of the Environment. On request, the Office of Enrollment Services will arrange to have application materials sent to the applicant.

All applicants for degrees in the Graduate School will have their files screened by the faculty of the Nicholas School of the Environment of the Graduate School. One of the faculty members must accept responsibility for advising the applicant before admission can be offered. It is therefore helpful for applicants to communicate with potential advisors before submitting an application.

The priority application deadline is December 31. However, applicants are encouraged to apply by December 1, if possible. Applications postmarked after this deadline will not be considered until all on-time applications have been processed. Applications received by December 1 require a \$50 application fee, as opposed to \$65 for those received after that date.

GENERAL REQUIREMENTS FOR THE DOCTOR OF PHILOSOPHY DEGREE

The Ph.D. is a research degree. Although course work is a necessary part of the student's program, the mere accumulation of course credits will not be sufficient for receiving the doctorate. The granting of the Ph.D. is based primarily upon the student's knowledge of a specialized field of study and upon the production of an acceptable dissertation embodying the results of original research.

Requirements. The formal requirements for the Ph.D. degree are as follows: (1) major and related courses, (2) foreign language, (3) a supervisory committee for program of study, (4) residence, (5) preliminary examination, (6) dissertation, and (7) final examination. In order to be considered for candidacy for the Ph.D. degree, the student must have passing grades in all courses.

Major and Related Courses. The student's program of study demands substantial concentration on courses in the department. However, a minimum of 6 units in a related field approved by the department must be included.

Foreign Language. Ph.D. candidates in the Nicholas School of the Environment are not ordinarily expected to have a reading knowledge of a foreign language. However, on recommendation of the student's supervisory committee, knowledge of one or more languages may be required.

Supervisory Committee. As early in a student's course of study as is practicable, and not later than two months before the preliminary examination, the director of graduate studies will nominate for the approval of the dean a supervising committee consisting of a minimum of four members, with one member designated as chairman. This committee will include at least three graduate faculty members from the school and at least one from outside the school. This committee, with all members participating,



will determine the program of study and administer the preliminary and final examinations.

Residence. The minimum registration requirement is six full-time semesters. The minimum full-time residence requirement is one academic year (two consecutive semesters) at Duke. Those entering with undergraduate deficiencies may be required to take undergraduate courses for which they will not receive degree credit. The student's supervisory committee will determine what requirements above the minimum, if any, the student must meet. More complete information and requirements for the preliminary examination, the dissertation, and the final examination are outlined in the bulletin of the Graduate School.

Undergraduate Degree in Environmental Sciences and Policy

A Bachelor of Arts degree with a major in environmental sciences and policy is available to Duke undergraduates interested in the interdisciplinary study of environmental issues. The major permits students to combine studies in the natural sciences and engineering with courses in the social sciences and humanities around general focus areas and themes. The major is specifically designed for students with career objectives such as environmental law, policy, management or planning that require an understanding of environmental issues that cross traditional disciplinary boundaries. Courses for the major are taught by more than sixty Duke professors in nineteen cooperating departments and schools.

Students interested in the Environmental Sciences and Policy Program should consult the Duke University bulletin of undergraduate instruction, available from the Office of Undergraduate Admissions, for further information. The program is administered through Trinity College of Arts and Sciences; a member of the Nicholas School of the Environment faculty serves as director.

Nondegree, Special Status

Persons interested in pursuing graduate or professional studies in natural resources not leading to a degree may apply for nondegree, special status. Such students may take from 3 to 12 units of course work each semester; they are registered with the university as a student with appropriate privileges and they receive transcripts of work completed for each semester in residence. If the student later applies for admission into a regular degree program, some of the courses may count toward the degree. Students wishing to study for only one or two semesters or to do postdoctoral work should apply for nondegree, special status. Additional requirements are contained in a later section on admissions.

Academic Regulations



Planning

The responsibility for the specific content of the academic plan of study rests with the student. A thorough familiarity with and understanding of the regulations contained in this bulletin as well as other sources provided by the school are essential to sound planning.

During the fall term each student is assigned a permanent faculty adviser. The adviser should be consulted in planning a course of study. Other members of the faculty, particularly those concerned with the plan of study, should also be consulted on an informal basis. Reassignment to another adviser can be obtained, but only when approved by the assigned adviser and the prospective adviser.

Registration

Entering students who register for the Master of Environmental Management or Master of Forestry degree will receive instructions by mail from the Nicholas School of the Environment a few weeks before the start of the fall term. Registration should be completed during the orientation week. Students in residence register for succeeding semesters at times scheduled in the university calendar.

Registration is approved by the adviser and completed by the student using a telephone registration system. Registration is required in order to take courses for credit or audit. To establish eligibility for university and other loans, for the student health service, and for study and laboratory space, a student must be registered. All tuition and fee payments and any indebtedness must be settled before registration will be completed.

Late Registration. All students should register at the times specified by the university. The charge for late registration is \$25.

Change of Registration. With approval of the adviser, the student can change registration for a period of ten days at the beginning of each semester.

Refunds. Tuition refunds are governed by the policy stated in the chapter on financial information.

Graduate School Registration. Students in Ph.D. degree programs initiate registration through the director of graduate studies of the Nicholas School of the Environment and complete it through the telephone registration system. Registration requirements and procedures are described in the bulletin of the Graduate School.

Reciprocal Agreements. Students enrolled full-time in the Nicholas School of the Environment or in the Graduate School during the regular academic year may enroll for six hours of credit per semester at the University of North Carolina in Chapel Hill, North Carolina State University in Raleigh, or North Carolina Central University in Durham provided that they are also registered for at least six hours of credit at Duke during the same semester. Similarly, graduate students in these schools may take up to six hours per semester at Duke. A student enrolled for two or more courses during a summer at Duke may take one of the courses at one of the neighboring institutions under the reciprocal agreement. This agreement does not apply to contract programs such as the American Dance Festival. The student must pay any special fees required of students at the host institution and provide his or her own transportation.

Immunization Requirement

The North Carolina immunization law requires students entering a college or university in the state to be immunized against the following diseases: measles, rubella, tetanus, diphtheria and, in some cases, polio. Each entering student is required to present proof of these immunizations in accordance with the instructions contained in the Student Health Services form provided with the student's matriculation material. This form should be completed and returned to Student Health Services prior to the student's first day of classes. Duke University cannot permit a student to attend classes unless the required immunizations have been obtained.

Courses

Course Descriptions. Courses offered by the school are described in the final section of this bulletin. However, courses are subject to change. A list of courses to be offered during a particular term, as well as schedules of courses offered in other departments at Duke and at neighboring universities, are available from the Office of Enrollment Services prior to registration for that term.

Independent Study. All students are expected to place increasing emphasis on independent study as they near completion of residence. ENV 299 lists a number of independent project areas. Several students can work together under the supervision of a faculty member by registering for ENV 200.

Master's Project. All students must complete a master's project of 4 to 6 credits. The project should be identified during the first term of study and initiated during the second and third terms. No student will be permitted to register for the fourth term of study until a project proposal has been approved by the student's adviser and has been received by the school's enrollment services office. During the final two terms major emphasis should be placed on the project. In completing the project, the student applies theoretical and analytical training acquired during the two years of study on actual natural resource or environmental problems. If desirable, arrangements can be made by the student or the school for consultation with other organizations concerning the scope and objectives of the project.

Students maintain close contact with their advisers during the development and writing of the master's project. Projects should reach final stages of completion by midterm of the final semester in residence. *A final draft of the project must be delivered to the adviser prior to 1 November for those graduating in December, prior to 1 April for those graduating in May, and prior to 1 August for those graduating in September.* The adviser is responsible for critical assessment and grading.

Auditing. Students registered for a full course load may audit courses free of charge. Otherwise, the audit fee is \$700 per course. Written permission of the instructor prior to registration for the course is required. Audited courses must be so indicated. In classes where enrollment is limited, students enrolled for credit will receive priority. Audited courses are recorded without grade on the student's permanent record. Regular attendance is expected. Changes from audit to credit are not permitted after the drop/add period.

Drop/Add. The period for dropping and adding courses ends on the tenth calendar day of the fall and spring semesters. During the summer, dropping or adding of courses is limited to the first three days of the term. Students are advised to make all class changes on the first day of class if at all possible. *Except under unusual circumstances, and with special permission of the dean, no reduction of tuition and fees is permitted unless classes are dropped on the first day of the drop/add period.*

Intensive Courses. For the special intensive courses, based on available space students may register during the semester two weeks prior to the first day of the course. Registrations are accepted on a first come–first served basis. Students in their second year are given priority. Students may not register for more than two intensives in a semester without permission of their adviser and the intensive course director. Students who wish to drop an intensive must do so prior to the first day of the course.

Retaking Courses. Courses required as a part of the program elected by the student or required by the adviser must be retaken if failed. Courses prerequisite to more advanced courses the student wishes to elect must be retaken if failed. Elective courses may be retaken if the student wishes to do so. See the section on grades, below, for additional information.

Credit Hours

Candidates for the professional degrees are considered fully registered when they enroll full-time for the number of semesters required in their individual degree programs. The normal registration to reach the required minimum units of credit is 12 units per semester, although a variation from 9 to 15 units is common. Students must have the permission of their adviser to register for more than 15 units in a semester, and all students who wish to enroll for fewer than 9 units must make a formal request to the education committee to study part-time.

Summer Registration. Professional degree candidates are normally not required to register for summer courses. However, a student who wants to supplement his or her graduate work with courses during the summer may do so through the Duke University Summer Session office. The cost is at the part-time rate per unit, and a summer health fee is assessed for students studying on campus. Summer registration does not affect the number of units, semesters in residence, or flat-fee tuition for the regular academic year.

Grades

The grading system used in the Nicholas School of the Environment and the Graduate School is as follows: *E* (exceptional); *G* (good); *S* (satisfactory); *F* (failing); *I* (incomplete); *Z* (continuing).

The grades of *P* (pass) and *F* (fail) are used in the Nicholas School of the Environment for seminars, master's projects, program area seminars and modular courses. At the instructor's option, the grades of *P* or *F* or regular letter grades are used for intensive courses and independent projects. The grade of *Z* is assigned for an independent project or a master's project which extends over a period of more than one semester; a final grade is given upon completion of the project. Credit hours for a course completed on

a pass/fail basis are creditable toward the master's degree as long as the course is not required in the student's major area of study. Permission for the pass/fail option must be obtained in writing from the instructor upon registration for a course.

Incomplete Grades. A grade of *I* indicates that some portion of the student's work is lacking, for an acceptable reason, at the time grades are reported. Requirements of all courses in which a grade of Incomplete is assigned by an instructor must be fulfilled within one calendar year following the date of the assignment of the incomplete grade.

In exceptional circumstances, upon recommendation of the professor who assigned the grade of Incomplete, the education committee may extend the time for completion of the course requirements. If, in the judgment of the professor and the student's adviser, completion of the requirements is not a reasonable alternative for the student, the student may petition the education committee to allow the grade of *I* to stand permanently on his or her record. No student will be allowed to graduate with an Incomplete unless permission has been granted for it to stand permanently on the record.

Failure. Any course for which a failing grade is received must be retaken or replaced with a substitute course. A substitute course requires the approval of the student's adviser and the education committee. Both the original failing grade and the grade received for the retaken or substitute course will appear on the student's transcript. Failure of a course also subjects the student to dismissal (see the sections on probation and dismissal and automatic dismissal).

Probation and Dismissal. Students are subject to dismissal from the school under any one or a combination of the following factors:

1. no grades higher than *S* during the first semester of study;
2. less than 6 units of *G* and/or *E* grades during the first full year of study;
3. a grade of *F* in any course at any time.

An appeal may be submitted through the adviser to the education committee to continue study under a probationary status. Probationary terms, set by the adviser, must be specific in the appeal and the appeal must be approved by the education committee. If probationary terms are met, the student will be returned to regular status. If probationary terms are not met, the student will be dismissed. Students will not be awarded degrees while on probationary status.

Automatic Dismissal. A student is automatically dismissed upon failure of more than one course.

Academic Irregularities

All cases falling outside the regular policies and procedures of the school are referred to the education committee for decision. The work of the committee includes review and decision regarding course requirements for graduation, student probation and withdrawal, student petitions for waivers of degree requirements, and all actions which deviate from established academic regulations.

A student who desires to petition the committee should do so by writing to the chairman. A precise statement of the reason for the request is required. The student will be notified in writing of the decision of the committee by the chairman.

Transcripts of Credit

A student who is registered for a course and who successfully completes the requirements as prescribed by the instructor receives credit on university records. A transcript fee, charged to all students during their first semester in residence, covers all future transcript requests. Transcripts of credit are issued only by the university Registrar, 103 Allen Building. Requests for transcripts, sent directly to the registrar, should

state clearly the full name under which the work was taken, the dates of attendance, and to whom the transcripts are to be sent. The student must sign the request for release of a transcript. No transcripts will be issued for students who fail to clear all financial obligations to the university upon graduation.

Length of Study

For a full-time student, the normal time for completing a professional master's degree is four semesters. Exceptions may be made for students who have an undergraduate degree in forestry and for students enrolled in the Senior Professional Program. No student, either full-time or part-time, is allowed more than five years to complete the requirements for the master's degree.

Leave of Absence or Withdrawal

Occasionally, special circumstances require a student to leave the university for one or two semesters at a time. If the reason for the departure is considered an emergency, the student may request a leave of absence for a period not to exceed one year. If the reason is to study elsewhere in a combined degree program, a leave will be granted for the length of study. If the student plans to do field studies or an internship, he or she must maintain university enrollment by paying a registration fee each semester of the academic year until full-time study is resumed.

Under all circumstances, the student must request the leave for a specific length of time prior to departure from the university. Extensions must be requested if they are required. Failure to request a leave or an extension of leave may result in a penalty charge and/or dismissal from the university. A student is eligible to request a leave of absence only after having completed at least one semester of study.

A student who wishes to withdraw must make a written request to do so. For refunds upon withdrawal, see the chapter on financial information.

Application for the Degree

Even if degree plans are tentative, a candidate for a degree must file an application for the degree no later than the end of the sixth week of the semester in which the degree is to be received. For a degree to be awarded in September, application must be filed no later than the beginning of the second summer session. The application for the degree is valid only for the semester in which it is filed. If the student does not receive the degree as expected, he or she must file a new application.

Graduation

All candidates are urged to attend the commencement exercises at which their degrees are to be awarded. A student who is unable to attend is required to file a petition with the dean, not later than four weeks prior to commencement, seeking permission to receive the degree in absentia.

Debts

Students are expected to meet all financial obligations to the university prior to completion of the degree. Failure to pay all university charges by the due dates specified by the university will bar the student from registration, class attendance, receipt of transcripts, certification of credits, leave of absence, or graduation until the account is settled in full. Further, an individual in default may be subject to withdrawal from the university.

Professional Programs



In the Nicholas School of the Environment, emphasis is placed on maintaining the highest standards of scholarship and on relevance to contemporary needs in natural resources study and research.

The school emphasizes three broad conceptual areas in its instruction and research: natural resource and environmental science, resource economics and policy, and quantitative methods of analysis and decision making. Regular courses, intensive courses, seminars, and special studies are offered in each of the three areas. Preparation for professional employment requires a higher degree of specialization than is characterized by this framework, however. Hence, seven programs of study have been designed by the faculty to assure professional competence in some aspect of natural resources while offering adequate breadth of educational experience. One of these programs, Forest Resource Management, is offered under the Master of Forestry degree. The remaining six—Biohazard Science; Coastal Environmental Management; Environmental Toxicology, Chemistry, and Risk Assessment; Resource Ecology; Resource Economics and Policy; and Water and Air Resources—are offered under the Master of Environmental Management degree.

Ph.D. candidates may also use these programs as a foundation for their course work.

Qualified students who have interests outside of the structured programs are permitted to design individual programs of study. Pursuit of an individual program requires preparation of a comprehensive statement of objectives and specification of each of the program components: major courses, quantitative courses, seminars, electives, and a master's project. All individual programs of study are subject to approval by the education committee. Students who wish to pursue an individual program of study must request approval of their program by the end of their second semester of enrollment.

Program Requirements

Each of the school's professional programs requires the completion of 48 units of credit. These units are distributed among a set of core courses constituting the major, quantitative courses, electives, a master's project, and seminars relevant to the program's objectives. These broad categories are discussed briefly below, and major (core) courses are listed for each program. More specific information about requirements for any one of the programs can be obtained from the Office of Enrollment Services.

Major (Core) Courses. Each program requires a series of core courses in the major area of study. These courses are specified or, in some cases, elective within the limits of the program emphasis.

Quantitative and Analytical Courses. All programs require 6 to 12 units in quantitative and analytical methods related to natural resource analysis, modeling, and management.

Elective Courses. Elective courses are available to give the student flexibility in developing his or her course of study. These credits are used to add depth to the major area of study or to develop a second area of expertise. Students who select the Resource Economics and Policy program and who have not had previous training in a natural resource area must use at least three of their elective courses to meet this requirement.

Master's Project. A master's project constituting 4 to 6 units of credit is required. These projects take the form of individual or small group research efforts related to some area of natural resource management.

Seminars. All students are required to participate in seminars in their program area for 1 unit of credit. During the spring semester of their second year in residence, students present the results of their master's project in a school-wide symposium.

Biohazard Science

The Biohazard Science Program is concerned with the impact on human health of hazardous materials in the occupational and environmental setting. Emphasis is placed on biological agents and their products, although consideration is given to chemical, physical, and ergonomic stressors in the workplace. The curriculum encompasses the principles and practices of microbiology, infection control, occupational and environmental medicine, environmental health, toxicology, industrial hygiene, ergonomics, health physics, risk assessment, hazard control, law, and safety management.

The goal of the program is to produce safety professionals possessing the ability to identify and assess workplace and environmental hazards and to develop strategies for the prevention, control, or mitigation of potentially hazardous situations. Graduates will be aware of regulatory mandates and community standards related to the occupational setting and the environment. They will understand the influence of legal, ethical, and management issues on the provision of a safe and healthy workplace and on the preservation of the environment.

Biohazard Science is an interdisciplinary program between the Duke Nicholas School of the Environment and the Division of Occupational and Environmental Medicine, Department of Community and Family Medicine, Duke University Medical Center. Duke offers exceptional opportunities for training in biohazard science, occupational and environmental medicine, toxicology, ecology, the biological sciences, and chemistry. Additionally, the Biohazard Science curriculum is enhanced by resources of universities in the Research Triangle area (particularly the University of North Carolina at Chapel Hill and North Carolina State University) and government and private organizations within the Research Triangle Park.

Biohazard Science is offered under the Master of Environmental Management degree. Students enroll in the first summer session after their first year of study in order to complete ENV 341L, Methods in Biohazard Science. The remainder of the summer is devoted to an approved practicum, which is expected to constitute the basis of the master's project.

Core Courses. ENV 246. Survey of Occupational Health and Safety; ENV 247. Survey of Environmental Health and Safety; ENV 340. Biohazard Science; ENV 342. Bioaerosols; ENV 343. Hazard Management, Law and Ethics; and one course in toxicol-

ogy. Students must also take ENV 341L. Methods in Biohazard Science and one course in each of the following topic areas: biostatistics and epidemiology.

Coastal Environmental Management

The Coastal Environmental Management program provides a scientifically rigorous understanding of global, national, and local physical and biological coastal environments and processes and the human behaviors and policies that affect, and are affected by, those environments and processes. The specific aim of the program is to train scientifically informed professionals to fill coastal policy and management, research, or advocacy positions in federal and state agencies, industry, consulting firms, and non-profit organizations. The program also provides a firm foundation for future Ph.D. studies.

The first year of the program is usually spent on the Durham campus fulfilling the required courses in areas such as natural resource economics, general environmental policy, ecology, and methodological skills. The second year is usually spent in residence at the Marine Laboratory in Beaufort taking courses in the natural, social and policy sciences specific to the coastal and marine environment, and focusing on the production of the master's project. The Marine Laboratory provides an ideal setting for the study of natural and social scientific phenomena in the coastal and marine environment, and for interaction with coastal and marine constituencies and policy makers in the application of science to policy. Potentials for participation in the policy-making process are emphasized throughout the program.

The Coastal Environmental Management program is offered under the Master of Environmental Management degree. The program provides an educational background in ocean science and coastal ecosystems and in natural resource and environmental policy as it applies to coastal and marine issues. Students may use electives and additional course work to accommodate a second emphasis in one of the other program concentrations offered within the school.

Core Courses. ENV 276 Marine Policy; ENV 270L Resource and Environmental Economics; one additional policy course; one ecology course; and two ocean science courses.

Environmental Toxicology, Chemistry, and Risk Assessment

The Environmental Toxicology, Chemistry, and Risk Assessment program (ETCRA) is concerned with the transport and fate, effects, and risks of pollutants to natural ecosystems and human users of those systems, as well as linkages between ecological and human health. ETCRA is a multidisciplinary program incorporating the concepts, information bases, and methodologies of ecology, toxicology, environmental chemistry, and risk assessment. The goal of the program is to produce scientists and environmental managers with a solid foundation in the principles underlying pollutant fates and impacts, as well as a firm grasp of state-of-the-art approaches for evaluating specific instances of environmental contamination and for making management decisions based upon quantitative analysis.

Duke offers exceptional opportunities for training in environmental toxicology, chemistry, and risk assessment. Ecotoxicology is a key component of the university-wide Integrated Toxicology Program. Additionally, the ETCRA curriculum is enhanced by resources of sister universities in the Research Triangle area (particularly the University of North Carolina at Chapel Hill and North Carolina State University) and institutions within the Research Triangle Park, such as the Environmental Protection Agency, the National Institutes of Environmental Health Sciences, and the Chemical Industries Institute of Toxicology.

Environmental Toxicology, Chemistry, and Risk Assessment is offered under the Master of Environmental Management degree. Students in the program are required to take a common core of courses that includes environmental toxicology and chemistry, ecology, environmental economics and policy, and statistics and risk assessment. Additionally, students are encouraged to develop a concentration in one of three specializations: environmental toxicology, environmental chemistry, or environmental risk assessment.

Core Courses. ENV 212. Environmental Toxicology; ENV 240. Fate of Organic Chemicals in the Aquatic Environment or ENV 242. Environmental Aquatic Chemistry; ENV 385. Decision Theory and Risk Analysis or a new course, Human and Ecological Risk Assessment; one graduate course in ecology; and one course in environmental economics, policy, or law.

Forest Resource Management

The Forest Resource Management program integrates biological and physical components of forest ecosystem management within an educational program that strongly emphasizes related environmental fields. The program builds knowledge in basic forest ecology and integrates this knowledge with foundations in a wide range of forest resources, including environmental quality. This distinctive approach is brought about by coordination of resource inventory course work; resource oriented courses such as soils, hydrology, silviculture, and tree physiology; management oriented courses that include modeling and ecosystem analysis; and courses in resource economics and policy. The Duke Forest is used as an outdoor laboratory in many courses.

The program emphasizes the use of computer based, quantitative techniques to facilitate ecosystem management. Various methods of analysis are applied to forest resources in order to optimize production within the context of biological, physical, and economic conditions.

The focus of the Forest Resource Management program is problem solving in complex ecologic and management systems. Within the program, students have the flexibility to gain depth in an area of specialization. Consequently, students may acquire skills that qualify them for positions in forest products industries, conservation organizations, government agencies, nonprofit organizations, and other groups concerned with the use and conservation of forests. The program can provide an excellent foundation for the Ph.D. and a career in research. Students who complete this program and also complete a Master of Business Administration degree in the Fuqua School of Business have particularly strong credentials for employment in private industry.

Forest Resource Management is offered under the Master of Forestry degree. Students may use electives and additional course work to accommodate a second emphasis in another program area within the school.

This program is accredited by the Society of American Foresters, which is recognized by the Council on Postsecondary Accreditation and the Department of Education as the accrediting body for forestry in the United States.

Core Courses. ENV 201. Forest Resources Field Skills; ENV 204. Forest Inventory, Growth and Yield; ENV 205L. Ecological Management of Forest Systems (Silviculture); ENV 213. Forest Ecosystems; ENV 270L. Resource and Environmental Economics; ENV 316. Case Studies in Environmental and Forest Management; plus one additional course in each of three broad categories—principles, practices, and management.

Resource Ecology

The Resource Ecology program is concerned with the application of ecological theory to the management of terrestrial and aquatic resources and ecosystems. An

integrated management scheme is advocated; that is, one which takes into account natural science as well as economics, ethics, and politics.

The framework for the development of management guidelines is provided by these general ecological mandates: the recognition of a hierarchical order of study (organism, population, community, and ecosystem); the understanding of connections among ecosystems and ecosystem processes; and the maintenance of ecosystem functions for future generations.

The applied thrust of the program allows the student to evaluate as well as to solve environmental management problems. Problem solving is based on the best possible scientific description and interpretation of ecological processes and analysis of appropriate data bases. Applied ecology recognizes the needs of environmental managers and provides an organizing framework for information to help minimize resource use conflicts.

A strong background in quantitative methods is required of students in this program, as it is for other programs offered by the school. Mathematical and conceptual models are invaluable in clarifying environmental problems. They are essential to describe basic biophysical and biogeochemical processes, to test hypotheses, and to predict and interpret the response of ecosystems to management and disturbance.

The specific objective of the Resource Ecology program is to train professionals for management or research positions with state or federal natural resource agencies, regional planning bodies, resource management companies, and consulting firms. Graduates of the program have practical experience with the analysis of ecological problems such as species conservation, flooding, disturbance of wetlands, integrated pest management, soil conservation, and mining reclamation.

Resource Ecology is offered under the Master of Environmental Management degree. Majors in the program select an area of concentration. Examples include aquatic/wetlands ecology, conservation biology, forest ecology, landscape ecology, or quantitative ecology. Students may use electives and additional course work to accommodate a second emphasis in another program area within the school.

Core Courses. Ecology courses are required at the ecosystem/community, population, and organismal levels of biological organization; ENV 270L. Resource and Environmental Economics; ENV 316. Case Studies in Environmental and Forest Management.

Resource Economics and Policy

Society long has had laws and institutions aimed at regulating the use of natural resources such as forests, wetlands, wildlife, water, and minerals. During the past few decades, new institutions have been developed to deal with problems of water and air pollution, toxic substances, and related areas of environmental degradation. These institutions demand a professional who has the necessary expertise to staff both public and private decision-making bodies.

The Resource Economics and Policy program is designed to train decision makers and those who advise them. The program emphasizes the basic methods needed by the professional for analyzing existing policy and for testing the possible outcome of new environmental and resource policy being considered by public and private agencies. The program is highly analytical and is oriented toward the analysis of contemporary national and international environmental problems.

Decision making in natural resource and environmental policy requires mastery of three broad areas of knowledge: the basic sciences pertaining to a natural resource or an environmental phenomenon; the relevant disciplines in the social sciences; and the quantitative methods required for using knowledge from the physical, biological, and social sciences to arrive at a decision.

Courses relevant to renewable and nonrenewable natural resources may be part of the student's educational background or may be planned as part of the master's degree. For the natural resource decision maker, the most important social sciences are resource and environmental economics, political science, and legal analysis. Economics includes environmental economics, the economics of public goods and externalities, public finance, and the intertemporal allocation of natural resources. Political science includes the behavior of administrative agencies, regulatory agencies, and legislative bodies. Legal analysis emphasizes the allocation of resources as reflected in property rights and environmental risks as reflected in torts. Quantitative methods, an essential component of this program, include statistical inference, methods of optimization, and benefit-cost analysis.

Resource Economics and Policy is offered under the Master of Environmental Management degree. Students may use electives and additional course work to accommodate a second emphasis in another program area within the school. Specializations are also available in international environmental policy, and marine and coastal zone management policy.

Core Courses. ENV 270L. Resource and Environmental Economics; ENV 274. Resource and Environmental Policy; and one of the following: LAW 327. Environmental Law or ENV 299.10 Resource and Environmental Law.

Doctoral Program. Students accepted for a doctoral program in resource economics and policy must have significant previous training in economics or another social science. Doctoral candidates in resource and environmental economics must take substantial course work in Duke's Department of Economics and pass the department's preliminary examinations in economic theory. Doctoral candidates in resource and environmental policy must take substantial course work in political science, public policy or political economy in relevant departments at Duke or cooperating universities.

Water and Air Resources

The program in Water and Air Resources enables students to obtain a scientific understanding of the basic physical and chemical processes affecting these natural resources and trains students to apply this understanding, together with quantitative, analytical and statistical techniques, to the management of these resources. Emphasis is placed on understanding the following: effects of land resource management on water quality; water quantity and transport; water and atmospheric chemistry; turbulent transport; and air pollution.

Course work and other training in the program cover basic physical and chemical processes relevant to hydrologic and atmospheric sciences, methods of quantitative and statistical analysis, and methods of management and decision making. The basic processes emphasized are those concerned with watershed hydrology; stream and lake water quality; water and atmospheric chemistry; general meteorology and climatology; and the origins, transport, and fate of aquatic and atmospheric pollutants. Quantitative analysis techniques include statistical methods, probabilistic and deterministic models, and optimization and simulation methods. These courses are integrated with others in water resource management, air resource management, and economic analysis.

Graduates of the program have the skills to become analysts or consultants for private industry and public agencies concerned with the management and protection of water and air resources. These employers include government agencies, public utilities, fuel and ore extraction companies, consulting firms, and hydrologic, atmospheric, or environmental research centers.

Water and Air Resources is offered under the Master of Environmental Management degree. Majors in the program can select an area of concentration: water resources, air resources, or a combination of water and air resources. Students may use electives

and additional course work to accommodate a second emphasis in another program area within the school.

Core Courses. At least one course from among those approved in each of four areas: physical sciences, chemical sciences, biological or ecological sciences, and social sciences; plus three additional courses in the area of concentration.



Admissions



Professional Versus Graduate Admissions

The student contemplating postbaccalaureate study at Duke in natural resources and the environment enters either the Nicholas School of the Environment or the Graduate School depending on the choice of degrees. The professional degrees, consisting of the Master of Environmental Management (M.E.M.) and Master of Forestry (M.F.), are administered by the Nicholas School of the Environment. Students wishing to earn either of these professional degrees should apply directly to the school. Those wishing to earn a Doctor of Philosophy (Ph.D.) degree should apply to the Graduate School. This chapter describes application to Nicholas School of the Environment professional degree programs.

Admission to the Nicholas School of the Environment

The Nicholas School of the Environment welcomes applications from men and women of all backgrounds who seek an intellectually challenging education designed to prepare them for leadership in a wide variety of natural resource and environmental careers. Admission is open to men and women who hold a bachelor's degree from an accredited college or university or who have completed at least three years of study in an institution participating in the Cooperative College Program. Admission as a special or nondegree student may also be granted under appropriate circumstances.

Prerequisites. All students admitted to the school are expected to have had the following:

1. Some previous training in the natural sciences or the social sciences related to their area of interest in natural resources;
2. At least one introductory course in calculus;
3. A statistics course that includes descriptive statistics, probability distributions, hypothesis testing, confidence intervals, correlation, simple linear regression, and simple ANOVAs;
4. A working knowledge of microcomputers for word processing and data analysis.

Each program requires additional courses or recommends additional preparation, as follows:

- Biohazard Science: undergraduate training in the microbiological sciences and chemistry;
- Coastal Environmental Management: microeconomics;
- Environmental Toxicology, Chemistry, and Risk Assessment: significant undergraduate education in biology and chemistry, with a course in organic chemistry required;
- Forest Resource Management: microeconomics, introductory ecology;
- Resource Ecology: microeconomics; introductory ecology;
- Resource Economics and Policy: microeconomics;
- Water and Air Resources: microeconomics; undergraduate training in chemistry recommended.

Although students without the level of preparation described above may be accepted for admission, it is expected that deficiencies will be made up prior to entrance by means of formal course work or other arrangements agreed upon by the applicant and the school. A limited number of deficiencies may be made up during the first year of residence; however, these courses will not count toward the 48 units of credit required for the M.E.M. or M.F. degree.

Admission Criteria. Admission to the Nicholas School of the Environment is highly selective. Academic performance as an undergraduate, scores on the Graduate Record Examination, and full-time work experience are the primary factors. Recommendations, the statement of educational goals, extracurricular activities, part-time and summer work experience, and other information requested on the application also provide a basis for selection.

The admissions committee considers each applicant as an individual. It attempts to evaluate each candidate for his or her academic potential, professional promise, and ability to benefit from and contribute to the goals of the school.

Application Procedures. Application for admission to the Master of Environmental Management and the Master of Forestry degrees is made through the Office of Enrollment Services of the Nicholas School of the Environment. All correspondence should be addressed as follows: Office of Enrollment Services, Nicholas School of the Environment, Duke University, Box 90330, Durham, N.C. 27708-0330.

Students are admitted at the beginning of the fall term, and spring term, provided that space is available. The application deadline is 1 February preceding the fall in which admission is desired. Because the school processes applications from more qualified students than it can admit, early submission of applications is recommended and no guarantee is made that applications received after the 1 February priority deadline will be considered.

Students who, because of unusual circumstances, wish to begin their studies in January should complete their application no later than 15 October prior to their matriculation.

Each applicant must submit the following before action can be taken. It is preferable that all materials be submitted together.

1. application form;
2. two copies of transcripts from each undergraduate and graduate school attended;
3. three letters of recommendation;
4. scores on the general (verbal, quantitative, and analytical) test of the Graduate Record Examination, taken within the last five years;

5. financial aid form;
6. a nonrefundable application fee of \$65 prior to January 1 and \$70 after January 1.
7. certificate of financial responsibility and TOEFL scores, if the applicant is an international student;
8. undergraduate dean's approval for students applying through the Cooperative College Program.

Application Forms. No applicant will be considered until the completed application form and all related documents are received by the Office of Enrollment Services. The admissions committee attaches considerable weight to the statement of educational objectives submitted by the applicant. This statement should reflect well-defined motivation to pursue graduate study. The school is particularly interested in applicants who show leadership potential in the broad field of natural resources and the environment. Applicants are expected to demonstrate the maturity and sense of purpose essential to a demanding educational experience, including a concept of the value of professional education to the applicant's career plans and expectations.

Transcripts. Two copies of official transcripts of all undergraduate and graduate study should be sent to the Office of Enrollment Services in the application package in sealed envelopes that have been signed across the flap by the registrar of the institution attended.

Letters of Recommendation. Each applicant is required to submit three letters of recommendation, preferably on the form supplied with the application. These letters should be sent in the application package in sealed envelopes that have been signed across the flap by the writer. These recommendations provide the admissions committee with evaluations of the applicant's past performance in academic and employment related situations. Although recommendations from any source are acceptable, it is preferable that as many as possible come from college instructors.

Graduate Record Examinations. All applicants for degree programs must take the general test (verbal, quantitative, and analytical) of the Graduate Record Examination (GRE). Subject tests are not required. For scores to be considered, the GRE must have been taken within five years of the date of application. The GRE is administered by the Educational Testing Service at locations throughout the world. Applicants are urged to take the exam at the earliest convenient date. Scores on tests taken later than December may not reach the school until after the 1 February priority deadline. Scores should be reported to Duke University code number 5156. Registration forms may be obtained by writing to GRE, Educational Testing Service, Princeton, N.J. 08540. Applicants are requested to send copies of their reports to the enrollment services office but official reports from the Educational Testing Service are required before admission decisions can be made.

Financial Aid Form. All applicants are expected to complete the financial aid form supplied with the admissions packet. Part 1 of this form indicates whether the applicant is requesting financial aid; part 2 indicates the student's financial need if aid is requested. The application for financial aid has no bearing on admission decisions. Academic criteria are the only standards used to determine admission into the professional or graduate degree programs.

Application Fee. A nonrefundable application fee of \$65 prior to January 1 and \$70 after January 1 is required of all applicants. A personal check, money order, or cashier's check made payable to Duke University is acceptable. Applications will not be officially received or processed until the required fee has been paid.

Additional Procedures for International Students. Each year the Nicholas School of the Environment welcomes a number of international students among its professional and graduate candidates. Applicants from other countries must meet the same criteria as applicants from the United States. All academic transcripts and other documents in

support of admission must be accompanied by an official translation if the original document is not in English. The nonrefundable application fee of \$70 (U.S.) must accompany the application. Applicants must have a fluent command of oral and written English. No allowance is made for language difficulty in arranging course schedules or in evaluating performance.

If the native language is not English, the applicant must submit scores on the Test of English as a Foreign Language (TOEFL) to be considered for admission. All arrangements for taking the TOEFL must be made directly with the Educational Testing Service, Box 6151, Princeton, N. J. 08540-6151; telephone 609-771-7100.*

All foreign Graduate School students whose native language is not English will be tested during their first registration period for competence in the use of oral and written English. Until such competence is determined, admission and arrangements for an award involving teaching must remain provisional. Students found to lack necessary competence should be prepared to assume all costs for being tutored in English and should reduce their course or research program by 3 units while being tutored. Students who do not successfully pass the test for competence in the use of oral and written English by the end of their first year of residency will not be permitted to continue their graduate work at Duke University.

The visa-granting authority in the student's country of origin, ordinarily the United States Embassy, requires proof that sufficient funds are available to the student to cover the expenses of all academic years of study before a visa can be granted. Foreign students are not eligible for federal and state loans, although they may qualify for certain educational loans through private United States agencies. Current immigration laws make it extremely difficult for the foreign student to find summer employment and permanent employment in the United States after graduation.

Interviews. An interview with a member of the admissions committee is not required but may be helpful to the applicant as well as to the school. Consequently, those applicants who can visit the school are encouraged to do so. The visit presents an excellent opportunity for the applicant to ask questions, gain insight into the school, and bring items of concern to the attention of the admissions committee. Applicants are encouraged to allow sufficient time to visit classes, meet students and faculty, and tour the university.

In general, visits can be scheduled on weekdays throughout the academic year. Appointments should be made at least two weeks in advance. Although visits during the summer months are possible, they should be scheduled well in advance since no summer classes are taught and faculty are frequently away from campus.

Each year representatives of the school travel throughout the country to visit undergraduate schools. Applicants from the cooperative colleges should check with their program adviser for details of these visits. Applicants from other institutions interested in meeting with a representative of the school should write or call the Office of Enrollment Services. In addition, it is sometimes possible to arrange an interview with an alumnus, particularly where distance precludes travel to Durham. In all of these situations the emphasis is on exchanging information with the applicant.

For further information or to arrange a school visit, applicants may write to the Office of Enrollment Services or call (919) 613-8070.

Deferred Admission. Normally, applicants are admitted only to the class for which they have applied. However, a deferral of admission may be granted for the applicant to gain experience or to strengthen academic qualifications for graduate

*In cases where an applicant's TOEFL score is low, the applicant may be accepted on the provision that he/she complete an intensive English language program.

study or for other valid reasons. Except in unusual circumstances, a deferral of admission cannot be granted for more than one year. Deferrals are granted on individual bases. The size of each class frequently precludes open-ended guarantees of future admission; however, applicants with substantial reasons for deferring the start of graduate work are encouraged to send a request to the Office of Enrollment Services as soon as possible after receiving an offer of admission. Offers of financial assistance are cancelled upon deferral of admission and students must be reconsidered for financial aid.

Application Deadlines for the Professional Programs. Application forms and all other information required to complete the application and to allow a student to be considered for admission should be submitted to the Office of Enrollment Services by 1 February for the fall term and by 1 October for the spring term. All candidates for admission should make arrangements to complete the Graduate Record Examinations well in advance of these deadlines.

Offers of admission, including financial aid awards, are mailed to accepted students in March. Decisions on applications received after the 1 February deadline are held until May and are made on an individual basis according to the availability of student spaces and financial assistance.

Response to Offer of Admission. When admission is approved, the applicant will receive an offer of admission and an acceptance form. A nonrefundable tuition deposit is required with acceptance of the offer. The admission process is not complete until the acceptance form and the tuition deposit have been returned to the Office of Enrollment Services. Failure to respond by the stated deadline may result in cancellation of acceptance.

Admission as a Senior Professional Program Participant

Applicants for either the Master of Environmental Management or Master of Forestry degree through the Senior Professional Program follow the same application procedures as regular students in the school. Applications should be submitted by 1 February for the fall term and by 15 October for the spring term. Normally, degree candidates in the Senior Professional Program take the required semester in residence during the term following admission.

Degree candidates enrolled through the Senior Professional Program are considered part-time students and are therefore not eligible for financial assistance from the Nicholas School of the Environment. They may, however, be eligible for federally funded student loans.

Admission to the Graduate School

Applications for Admission to Ph.D. degree programs should be obtained from and returned to the Dean of the Graduate School, Duke University, Box 90065, Durham, N.C. 27708-0065. Applicants to these programs must follow the procedures and meet the deadlines specified by the Graduate School. Initial inquiries and questions concerning fields of study are best directed to the Director of Graduate Studies, Nicholas School of the Environment. In addition, prospective students are urged to write directly to professors whose research interests match their own to discuss opportunities. Although the priority application deadline for the Graduate School is 31 December, applicants are encouraged to apply by 1 December.

Admission with Nondegree Status

Persons wishing to enter the Nicholas School of the Environment as nondegree students must submit a special application form requesting nondegree status along with an application fee of \$25. The applicant must have completed a bachelor's degree from an accredited college or university and must submit an official transcript of all previous course work. The Graduate Record Examination is not required although the GRE score

is helpful in the admissions process. The student must have one letter of recommendation; this letter should indicate why the applicant should be allowed to undertake nondegree study at Duke. The application itself requires a brief statement of purpose in which the applicant should state his or her reasons for such study at Duke.



Financial Information



Tuition and Fees*

Estimated Expenses for the Academic Year. The following approximate costs, applicable in 1996-97, are indicative of costs that can be expected by M.E.M. and M.F. candidates; Ph.D. students should consult the bulletin of the Graduate School.

Tuition (\$8,250 per semester)	\$16,500
Student health fee (\$200 per semester)	\$400
Student government fee	\$14
Housing	\$3,800
Food	\$3,100
Books and supplies	\$875
Transportation	\$1,000
Motor vehicle registration	
automobile	\$120-150
motorcycle	\$35

In addition to these necessary expenses, the student will incur others which will depend to a large extent upon individual tastes and habits. The average Duke student, however, can plan on a budget in the range of \$23,000 to \$28,650 for the academic year. Students with families naturally will have higher expenses.

Flat-fee Tuition. The flat-fee tuition allows Master of Environmental Management and Master of Forestry degree candidates to register for 9 or more units of credit for a fixed tuition payment per semester. The normal full-time enrollment is expected to be 12 units per semester, although units may vary from 9 to 15 depending upon the student's academic and assistantship requirements. Permission is required to register for fewer than 9 or more than 15 units in a semester.

Students in the two-year M.E.M. and M.F. programs will pay the flat-fee tuition for four semesters. Students in one of the concurrent degree programs will pay the flat fee

*The figures contained in this section are projections and are subject to change.

for those semesters in which they are registered as full-time students in the Nicholas School of the Environment. Students in the concurrent M.E.M./M.F. program pay the flat-fee tuition for a minimum of five semesters. Students in the one-year M.F. degree option will pay the flat fee for two semesters.

If the student is permitted to be enrolled part time (fewer than 9 units), he or she will be charged per unit of credit (\$700 per unit for the 1996-97 academic year).

Students who wish to earn additional credits during the summer will be charged at the part-time rate per units of credit. Students who have completed the required semesters in residence and all course requirements except the master's project will be charged a minimum registration fee (\$350 for 1996-97) each semester until the degree is completed.

All students are expected to be registered in residence, to be approved for a leave of absence, or to pay a minimum registration fee for each semester until their degree is completed.

Payment of Accounts. Invoices for tuition, fees, and other charges are sent by the Office of the Bursar and are payable by the invoice due date. As a part of the agreement of admission to Duke University, a student is required to pay all invoices as presented, unless other arrangements are made in advance. If full payment is not received, a late payment charge as described below will be assessed on the next invoice and certain restrictions as stated below will be applied. Students interested in arranging a payment plan should contact Tuition Management Services, 42 Valley Road, Newport, R.I. 02842-6376; telephone 800-722-4867.

Late Payment Charge. If the *total amount due* on the student invoice is not received by the invoice due date, a penalty charge will be accrued from the billing date. The penalty charge will be at a rate of 1.25 percent per month (15 percent per annum) applied to the *past due balance*. The *past due balance* is defined as the previous balance less any payments and credits received during the current month. Student loan payments, if delayed for reasons beyond the individual's control, are treated as a credit on the student's invoice until the loan payment is received.

Restrictions. An individual will be in default of this agreement if the *total amount due* is not paid by the due date. An individual who is in default will not be allowed to register for classes, receive a copy of the academic transcript, have academic credits certified, be granted a leave of absence, or receive a diploma at graduation. In addition, an individual in default may be subject to withdrawal from the university.

Tuition Refund Policy. In case of withdrawal from the university, Title IV federal financial aid received by students enrolled for the first time at Duke will be refunded on a pro rata basis. The pro rata formula is defined as the total school charges times the remaining portion of the enrollment period for which the student has been charged, rounded downward to the nearest 10 percent, less any unpaid charges owed by the student. The pro rata refund policy does not apply to any student whose withdrawal is after the 60 percent point in the period of enrollment. Sample refund calculations are available from the enrollment services office.

If the student receives federal financial aid but is not attending the university for the first time or if the student does not receive federal financial aid, tuition will be refunded or carried forward as a credit for later study according to the following schedule:

Withdrawal	Refund
Before classes begin	full amount
During first or second week	80 percent
During third, fourth or fifth week	60 percent
During sixth week	20 percent
After sixth week	none

This schedule also applies to housing charges of students moving from university housing to off-campus housing. The student health fee will not be refunded except when withdrawal occurs before classes begin. In the event of death, a full refund of tuition and fees will be granted.

Late Registration. Students who register at a date later than that prescribed by the university must pay a fee of \$25 at the bursar's office.

Audit Fee. Students registered for a full course load may audit courses without charge. Otherwise, audit fees are \$700 per course.

Transcripts. Transcripts are available on request from the Duke University Office of the Registrar. During their first semester in residence, students are charged a \$30 fee that covers the request of transcripts. Transcripts cannot be issued by the Nicholas School of the Environment.

Housing Charges. On-campus housing for professional and graduate students is available on a limited basis. Questions regarding costs should be addressed to the Office of Housing Administration, Duke University, Box 90451, Durham, N.C. 27708-0451.

Motor Vehicles. Motor vehicles parked on campus must be registered with the parking services office. Registration must be completed within five days after operation on campus begins. The proper registration decal should be displayed on the vehicle. The automobile registration fee is \$140 in ungated lots and \$175 in gated lots. Motorcycle registration is \$40.

Student Health Fee. All students are assessed a fee for the Student Health Service. For the fall and spring, the fee is \$400 (\$200 per semester). For the summer, the fee is \$55 per term.

Medical Insurance. All resident students are automatically billed for health insurance at the rate of \$660 per year (single student cost). Family plans are more and are available through the university bursar's office. A student who is covered under a family, group or individual major medical policy must sign a waiver form indicating that he/she does not wish to be covered by the university student insurance policy. All foreign students are required to register for student insurance (and for the family plan if they have a spouse or children living in Durham) unless they have valid documentation indicating major medical coverage acceptable in the United States.

Tuition and Fees for the Summer. For M.E.M. and M.F. students who wish to take additional credits during the summer, registration is charged per unit of credit (\$700 per unit in summer 1997). The summer student health fee and audit fee are listed above. Information on fees, housing, policies and procedures related to the Duke University summer session is available from the Office of Summer Programs, The Bishop's House. Students who are interested in summer study in Beaufort should consult the bulletin of the Nicholas School of the Environment Marine Laboratory.

Athletic Events. Students are admitted free of charge to all regularly scheduled university athletic events held on campus during the academic year, with the exception of basketball. Students who wish to attend home basketball games must enter the student ticket lottery and pay for tickets if selected.

Financial Assistance

Financial assistance in the form of scholarships, fellowships, or assistantships is available for qualified students pursuing either the professional degrees (M.E.M. or M.F.) or the graduate degrees (Ph.D.). Students enrolled through the Senior Professional Program are not eligible for school supported financial assistance but may be eligible for federally funded student loans.

All professional degree students must file the Free Application for Federal Student Aid (FAFSA) to be considered for student loans and work study.* Applicants may obtain a FAFSA form from a college or university counseling and placement center or financial aid office. Professional degree applicants must also complete the financial aid form included in the admissions materials. Scholarships are granted from university funds which are in limited supply. Consequently, only well-qualified students can expect to receive awards. Scholarships are awarded on the basis of demonstrated outstanding academic ability and a high degree of professional promise.

Fellowships are obtained from foundation grants, private industry, or individual donors. Donors of fellowship funds sometimes place restrictions on the use of the funds as well as on the amount of awards.

Research assistantships are obtained primarily from grant and contract funds awarded to various faculty in the school. University-funded assistantships are available for students who have sufficient experience to contribute to one or more ongoing research or academic programs.

Pursuant to the Tax Reform Act of 1986, students performing any services (whether degree related or not) required by their scholarship, fellowship or assistantship must have income taxes withheld. However, if the student anticipates no tax liability at the end of the calendar year, he or she can note "exempt" on the state and federal withholding forms and no taxes will be withheld. Income tax information is reported to the student by the university in January.

In all instances, admission to the school is a prerequisite for the award of assistance in any form. If offered financial assistance, professional students normally will receive the award for two years of study; it is expected that they will complete their degree within this period of time. For graduate students, it is the policy of the school to provide financial assistance through university funds for three years; it is expected that Ph.D. candidates will obtain research grants to fund their study past the third year. However, the school has the right to examine the progress of each student to determine eligibility for continuation of awards beyond the first year.

No student will receive financial aid while on probation.

Eligibility for Financial Assistance

A significant portion of the financial assistance for students in the Nicholas School of the Environment is provided by federal, Title IV funds. To qualify for such funding, usually in the form of loans, students must meet federal eligibility requirements including the maintenance of satisfactory academic progress. Professional degree students must complete at least 18 units of course work with at least 6 units of *G* and/or *E* grades during the first full year of study and may not receive a grade of *F* in any course to be eligible for federal financial aid for their second year.

Although professional degree students have five years from the first date of matriculation in the school to complete their degree requirements, they are eligible for federal financial assistance for the equivalent of four full-time semesters only. Students who fail to meet the satisfactory academic progress requirements or need federal financial assistance for more than the equivalent of four semesters may appeal to the admissions and awards committee.

Graduate degree candidates should review the Graduate School bulletin for details regarding satisfactory progress for their degree program.

*A separate application must be filed for each academic year.

SCHOLARSHIPS

University Scholarships. A limited number of scholarships are awarded each year to selected students who are pursuing either professional or graduate degrees. Awards are made on the basis of academic qualifications and professional or scientific promise. Amounts of awards vary.

FELLOWSHIPS

Rachel Carson Graduate Fellowship. A fellowship is awarded to a selected student who is conducting research related to some aspect of the Rachel Carson Estuarine Research Reserve.

Federal Paper Board Company Fellowship. A fellowship is awarded each year to a selected student interested in a career in industrial forestry. The stipend ranges up to \$5,000 per year.

Virgil L. Fischer Fellowship. A fellowship is awarded each year to a second-year Master of Environmental Management or Master of Forestry candidate with demonstrated financial need. The stipend is determined by the amount of endowment income each year.

Leroy B. George Fellowship. A fellowship is awarded to a selected student from the Haywood or Buncombe counties or the Hendersonville, North Carolina, school systems. Second preference is given to a student from the southern Appalachian region. If a qualified student cannot be identified within the region the fellowship may be awarded to a student in the school who has a demonstrated interest in resource and environmental education and planning. The amount of the fellowship is set at \$1,000 per year.

Richard E. Hug Fellowship. A fellowship is awarded to a selected student who is pursuing a Master of Environmental Management or Master of Forestry degree. The stipend ranges up to \$2,000 per year.

Integrated Case Studies Fellowship. Fellowships are awarded to selected students who present appropriate case study proposals in applied ecology. Stipends range up to \$3,000 per year.

Mary Derrickson McCurdy Graduate Fellowship. A fellowship is awarded to a selected student who is conducting research at the Nicholas School of the Environment Marine Laboratory.

Andrew W. Mellon Foundation Fellowship. Fellowships are awarded each year to selected students pursuing master's or Ph.D. degrees. Stipends range from \$1,000 to \$5,000 a year.

Muchnic Foundation Endowment Fellowship. A fellowship is awarded each year to a selected Master of Environmental Management or Master of Forestry candidate who has demonstrated financial need.

Robert Safrit Graduate Fellowship. A fellowship is awarded to a selected student who is conducting research in some aspect of marine science at the Nicholas School of the Environment Marine Laboratory.

Nicholas School of the Environment Alumni Association Fellowship. Fellowships are awarded each year to selected students who are pursuing a Master of Environmental Management or Master of Forestry degree. The students must have completed one year of study. The amount of the fellowships is set at \$2,000 per year.

Nicholas School of the Environment Alumni Association Minority Fellowship. A fellowship is awarded to a selected minority applicant for the Master of Environmental Management or Master of Forestry degree. The amount of the award is determined by the endowment income each year.

Harvey W. Smith Graduate Fellowship in Biological Oceanography. A fellowship is awarded to a selected student who is conducting research in biological oceanography at the Nicholas School of the Environment Marine Laboratory.

Frederick K. Weyerhaeuser Forest History Fellowship. This fellowship is available campus-wide to graduate students who wish to study broadly in the area of forest and conservation history. The annual stipend is \$11,000. Inquiries should be made to the Forest History Society, 701 Vickers Avenue, Durham, N.C. 27701.

Sara and Lewis Zirkle Fellowship. Fellowships are awarded to selected students pursuing master's or Ph.D. degrees. The stipend is determined by the amount of the endowment income each year.

ASSISTANTSHIPS

Assistantships for the Professional Degree Candidate. Assistantships may be awarded to a select number of professional students during their first year of study to assist faculty and staff with teaching, research, professional and other projects. It is expected that students will work for 10 hours a week on their assigned project. *Assistantships require a regular schedule for work to be arranged between the student and the faculty or staff member to whom he or she is assigned.* During the second year of study, professional students may fulfill the assistantship requirement by working independently on their master's project.

The hours of assistance may limit the number of credit hours for which a student may register. Normally, professional students who receive assistantships for 10 hours per week are limited to 12 units of credit per semester. Exceptions require the permission of the student's adviser.

Most assistantships are paid by the school on the monthly payroll. For the 1996-97 academic year, the award for 10 hours of assistance was \$3,000.

Normally, assistantships are available only for the academic year and require full-time enrollment in the school. A few awards may be available during the summer, however, for faculty research, staff, and Duke Forest assistance. Summer stipends are paid on a biweekly or monthly basis.

Teaching Assistantships for Ph.D. Candidates. A selected number of Ph.D. candidates each year may be offered a financial aid package consisting of full tuition plus a monthly stipend. The tuition is a scholarship from school funds and is tax exempt. The monthly stipend (\$1,167 per month in 1996-97) requires 10 to 12 hours of work per week during the academic year and is taxable.* These graduate assistants may be retained by the faculty through research funding for the remaining three months of the summer.

Typically, the Ph.D. candidate is assigned to a member of the faculty to work on a particular research project under his or her direction and/or to provide teaching assistance. Furthermore, the research undertaken is normally a part of the student's graduate program and serves as a basis for the doctoral dissertation. With few exceptions, assistantships are available only for the first three years of graduate study.

Graduate assistants are required to maintain a regular schedule of work as determined by the faculty member to whom each is assigned.

*Students receiving these stipends are assigned by the director of graduate studies to serve as teaching assistants for various faculty. Normally these teaching assistantships are available only for the first three years of graduate study.

Research Assistantships. Funded from grant and contract research under the direction of various members of the faculty, research assistantships provide support during the latter stages of study of the Ph.D. candidate. Typically, the research assistant completes one or more phases of a research project under the direction of the principal investigator, a member of the faculty. Normally, the research completed forms a substantial component of the requirements of the Ph.D. dissertation. However, in some instances this may not be the case and the students pursue dissertation research in a related area of study.

The stipend and level of service required of research assistants depend primarily on the nature of a particular research project and the availability of funds. Normally, research assistants are committed to 720 hours of service during the academic year (20 hours per week). Some research assistantships require full-time service during the summer. A regular schedule of research under the direction of the principal investigator must be maintained.

Work-Study. Work-study funds are administered for student employment through the Office of Enrollment Services. At the beginning of the academic year, students are made aware of work-study opportunities and informed of the application procedures. Interested students should file the Free Application for Federal Student Aid (FAFSA).

Application for Awards for the Entering Student

Application for awards is made concurrently with the application for admission. Applicants should initiate the necessary action early to ensure that the required documents are filed with the school's Office of Enrollment Services on or before 1 February prior to enrollment.

Notification and Acceptance of Awards. Recipients of awards are notified in March. Completed applications received after the 1 February priority deadline will be considered if vacancies occur at a later date.

Scholarships, fellowships, and the various categories of assistantships provide the basis for professional/graduate student support. Once offered by the university or the school, funds are committed to one student and are therefore unavailable to others. *As a consequence, it is the policy of the school that all awards offered can be declined prior to 1 May without prejudice. However, offers accepted and left in effect after 1 May are binding for both the student and the school.*

Loans

In terms of a needy student being able to afford the graduate program of his or her choice, federally insured student loans are often necessary and useful. Students should consider the nature of the loan and the positive and negative aspects of future loan payments, as well as investigate all other forms of financial assistance.

Federal law requires all students to have completed a Free Application for Federal Student Aid (FAFSA) to determine financial need. The FAFSA form may be obtained from a college or university counseling and placement center or financial aid office. No loan application will be processed without the FAFSA form having been submitted to the central processor.

In addition, federal law requires submission of financial aid transcripts from colleges previously attended, a statement of educational purpose, and a statement of compliance with Selective Service registration. In some cases, verification of income and other information are required.

Federal Stafford Loans. Federal Stafford Loans of up to \$18,500 (\$8,500 subsidized and \$10,000 unsubsidized) are available for eligible graduate/professional students. For loans made to new borrowers, interest is calculated at a variable rate, not to exceed 8.25 percent. Students who have outstanding loans retain their current interest rate. If a

student is eligible for a subsidized Federal Stafford Loan, the interest is paid by the federal government while the student is enrolled in school. Interest on unsubsidized loans must be paid by the student during enrollment or capitalized to the principal at the borrower's request.

Students may be eligible for a combination of subsidized and unsubsidized loans. Eligibility for the subsidized loan is determined by subtracting all financial aid awards and the student's expected contribution from the Nicholas School of the Environment's student budget. The student's contribution is computed from the income and asset information submitted on the FAFSA. Eligibility for the unsubsidized loan takes into consideration the other financial aid being received by the student, but the expected student contribution is not considered. Students may borrow from the unsubsidized loan program the difference between the student budget and their other aid (including any subsidized Stafford Loan), up to a maximum of \$10,000 for an academic year.

To obtain a Federal Stafford Loan, students may apply to either a state agency or a bank that participates in the program. A partial listing of lenders is available from the school's enrollment services office.

Students who borrow through the Federal Stafford program will be given entrance and exit interviews concerning the projected and actual costs of their loans. They will also be provided with information on loan consolidation, should this be desired or needed.

Federal Carl Perkins Loans. Loans through the Federal Carl Perkins program are administered through the university for students who qualify under the federal guidelines. The student must qualify as needy by the FAFSA form and in need of additional assistance beyond the maximum Federal Stafford allocation. The interest rate is 5 percent, with payment on interest and principal deferred until six months following graduation.

GradSHARE Loans. Duke University participates in a private student loan program called GradSHARE which enables students to borrow up to \$15,000 per year to meet educational expenses. Repayment of the principal and interest may be deferred. Two interest rate options are available: a monthly variable rate that does not exceed the prime rate, or a one-year renewable rate that is set annually and will not exceed the prime rate.

Unlike the federally subsidized loans, GradSHARE loans are available to students who do not qualify under federal guidelines. Under GradSHARE a graduate or professional student may be able to borrow up to \$7,500 per year without a cosigner.

Interested students should write directly to the school for further information.

Federal Grant Programs. Students with only three years of study at one of the institutions in the Cooperative College Program may be eligible for undergraduate state and federal grant programs. Such students should consult their undergraduate financial aid officers, state loan agencies, or federal granting agencies for applications, requirements, and restrictions.



Marine Laboratory



General Information

The Marine Laboratory is a campus of Duke University and a unit within the Nicholas School of the Environment. Its mission is education and research in basic ocean processes, coastal environmental management, marine biotechnology and marine biomedicine. The laboratory operates year-round to provide training and research opportunities to about 3,500 persons annually, including undergraduate, graduate and professional students enrolled in the university's academic programs; visiting student groups who use the laboratory's facilities; and scientists who come from North America and abroad to conduct research. A seminar/lecture series features many distinguished scientific speakers from across the nation and abroad.

As an interdepartmental training and research facility of Duke University, the Marine Laboratory operates under the policies, procedures, and regulations of the university. Its faculty are affiliated with specific departments and schools of the university and represent the disciplines of oceanography, marine biology, marine biomedicine, marine biotechnology, and coastal environmental management.

Location and Natural Environment

The Marine Laboratory is situated on Pivers Island within the Outer Banks of North Carolina, only 150 yards across the channel from the historic town of Beaufort, and is readily accessible by automobile.

Beaufort has become important in recent years as a seaside resort. The area is well known for its historic and scenic attractions and its moderate climate, tempered by the Gulf Stream. It is surrounded by fishing and agricultural communities. There are ample opportunities for recreation both in and around Beaufort and on the Marine Laboratory campus. Cape Lookout National Seashore Park and the Rachel Carson Estuarine Research Reserve are within easy boating distance.

The area's system of barrier islands, sounds, and estuaries is rich in flora and fauna and in diverse terrestrial and aquatic habitats, making the laboratory an ideal location for study and research.



The Beaufort Experience

The Nicholas School of the Environment Marine Laboratory is an academic community, and the self-sufficient nature of its residential life serves well those who wish to study or to conduct research on the island. The academic programs are limited to eighty students per regular academic semester (spring or fall) and one hundred per summer term, offering an unparalleled small-group learning experience. Although recreational opportunities are ample, the distractions are limited, allowing both student and researcher to become totally involved in the pursuit of marine science. Both students and researchers alike find that the Marine Laboratory has an invitingly open, friendly, and relaxed atmosphere that draws many back year after year. This community feeling, the potential for total immersion in learning, and the beauty of the natural environment have contributed to what has been called "The Beaufort Experience."

Teaching and Research Facilities

The Marine Laboratory's modern physical plant consists of twenty-three buildings, including four dormitories, a large dining hall, one residence, boathouse, storehouse for ship's gear, classroom laboratories, six research buildings, and a maintenance complex. The Marine Laboratory operates the R/V *Susan Hudson*, a 50-foot fully-equipped coastal oceans research vessel, and is the home port for the R/V *Cape Hatteras*, a 135-foot oceanographic research vessel operated by the Duke/University of North Carolina Oceanographic Consortium for the NSF.

Each research laboratory building is air-conditioned and equipped with running seawater through a PVC system. There are tanks, water tables, aquaria, autoclaves, ovens, and outdoor continuous-flow growth facilities, as well as the more specialized instrumentation, a complete sedimentological research laboratory is equipped for state-of-the-art chemical and size analyses.

The Nicholas School of the Environment Marine Laboratory is the site of one of Duke University's public access IBM-PC clusters. A Macintosh cluster is available for word processing and simple graphing projects. The laboratory also operates an AT-compatible computer for processing and analysis of static and moving images. Color printing and scanning services are available on the island.

Research and teaching facilities also include the I. E. Gray Library-Auditorium which houses the Pearse Memorial Library, a specialized branch of the Duke library system. Cooperative agreements provide access to the collections of the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA/NMFS) and University of North Carolina Institute of Marine Sciences (UNC/IMS) marine science libraries, located nearby.

The laboratory also maintains darkrooms, a well-equipped workshop, a stockroom, and a purchasing department.

Opportunities for Students

The resident faculty offer a wide variety of graduate courses in the marine sciences that are appropriate for students planning careers in basic or applied research and/or teaching, environmental management or policy sciences, or environmental health sciences. Courses are offered during both the academic year and the summer. Many of the courses are cross-listed with the Graduate School Departments of Botany, Cell Biology, the Environment, Geology, Public Policy Studies and Zoology. Graduate research or individual study courses are also offered. Most of the summer courses carry 4 or 6 units of credit and include laboratory and direct field or shipboard experience.

Students have access to all laboratory facilities and the opportunity to meet visiting scientists from around the world. Room and board are available, and summer tuition scholarships are offered on a competitive basis.

Further information and application materials may be obtained from the Admissions Office, Duke University Nicholas School of the Environment Marine Laboratory, 135 Duke Marine Lab Road, Beaufort, N.C. 28516-9721; telephone (919) 504-7502.

Research Centers



Research centers in the Nicholas School of the Environment are by design and intent flexible, multidisciplinary units. A major aim is to bring together specialized groups of scholars and professionals from many disciplines to focus their attention on current natural resource and environmental problems. The centers are headed by a director and staffed by an interdisciplinary faculty from Duke, neighboring universities, and a variety of public and private research organizations. Depending upon the level of funding, the centers may also employ research assistants and other support staff. The centers do not offer courses or degrees; rather, they offer students, scientists and other professionals an opportunity to participate in research through collaboration with affiliated faculty.

Center for Forest Resources

Director: Daniel D. Richter, *Associate Professor, Nicholas School of the Environment*

The objective of the Center for Forest Resources is to promote and conduct research that increases the ability to understand, use, and conserve forest ecosystems. This research is conducted worldwide and is motivated by a broad number of issues, including ecosystem and biogeochemical sustainability, species competition, air pollution effects, water cycling, energy flow, economic values, conflict resolution over management alternatives, and policy analyses.

Duke's location in the USA South provides researchers and students with a special perspective of forestry ecology and management. The region is the world's most productive for forest wood products. Sustaining this enormous economic and ecosystem productivity depends upon long-term ecosystem dynamics that are strongly governed by a past in which these ecosystems have been intensively used and frequently degraded by agricultural practices, and a future in which improved management practices are critical to develop. Improving the water quality, soil capability, wildlife habitat, biogeochemistry, and management of these forest ecosystems are subjects of various studies.

Duke research on the southern pine is internationally regarded and includes the Korstian-Christensen studies of forest succession in the Duke Forest, the four-decade study of forest-soil biogeochemical sustainability at the Calhoun Experimental Forest in South Carolina, and the large collaborative project with Brookhaven National Laboratory to investigate effects of carbon dioxide on pine ecosystems in the Duke Forest.

The center benefits the school's educational activities in forest ecology, general ecology, silviculture, soil sciences, hydrology, modeling, and related social sciences. Center activities include a weekly discussion, guest speaker or forum. Ultimately, the center intends to be able to fund student research, fellowships, and visiting professorships.

Center for Resource and Environmental Policy Research

Director: Robert G. Healy, *Professor, Nicholas School of the Environment*

The Duke University Center for Resource and Environmental Policy Research is committed to objective and timely analyses of critical natural resource and environmental issues, both national and international.

During the past few years, a substantial and comprehensive body of legislation has been enacted to address resource and environmental problems, much of it strongly influenced by information provided by special interest groups. Often, this legislation has been drafted and passed in a quasi-crisis atmosphere with a consequent absence of mature deliberation. The center was developed in response to recognition of the many conflicts developing over competitive use of natural resources and consequent legislative regulation.

Because contemporary resource-environmental problems are deeply embedded in the social, economic, and political fabric of the country, they are in need of careful and deliberate study. It is in the national interest that such issues be examined in a setting conducive to independent thought with appropriate regard for timeliness of results and conclusions. The Center for Resource and Environmental Policy Research is a unit of Duke University designed specifically to provide the proper setting for such an approach.

Among the current research topics are:

- Land use planning and rural development
- Soil and water resources policy
- Forest economics and policy
- Environmental risk analysis
- International resource and environmental policies
- Coastal zone management
- Tourism and the environment
- Economic valuation of the environment
- Sustainable Third World development
- Waste management and recycling
- Business firms and environmental management

Center for Tropical Conservation

Co-Directors: John W. Terborgh, *James B. Duke Professor, Nicholas School of the Environment*; Carel P. van Schaik, *Associate Professor, Department of Biological Anthropology and Anatomy*

The Duke University Center for Tropical Conservation (CTC) grew out of a common concern on the part of faculty from many disciplines for a host of global problems that originate in the interaction of humans with the environment. The world faces a series of worsening crises, notably overpopulation, landlessness, pollution, deforestation, climate change, poverty, disease, and increasingly, famine. The goal of the Center for Tropical Conservation is to contribute to the alleviation of the world environmental crisis, particularly as it affects the developing countries of the tropics.

The CTC works toward this goal through a tripartite program of research, training and communication. CTC research is of an interdisciplinary nature, based on collaboration among natural and social scientists. The development of technologies for managing natural resources is coupled with economic analyses to suggest policy reforms that would promote the sustainable use of these natural resources. CTC research is being immediately incorporated into Duke University courses and seminars by participating



researchers and faculty. Information is disseminated through academic and semipopular publications, courses, newsletters, workshops and conferences. Ultimately, the results of CTC research and training will be made available to governmental and nongovernmental organizations in both the United States and the developing world.

The CTC has developed the International Professional Training Program in response to the need for broadly educated environmental managers and policy makers in developing countries worldwide. The program recruits early- to mid-career professionals from developing countries who are already working in governmental and nongovernmental environmental institutions. Citizens of developing countries are selected for the program with particular attention to their potential to influence their nations' policies regarding tropical forest management, conservation, and natural resource use.

Current research focus areas are:

- Managing for biodiversity
- Natural forest management in the tropics
- Forestry institutions in the tropics
- Environmental policy in the context of political and economic change
- Ecotourism

The Center for Tropical Conservation is housed in the Simons Building, 3705-C Erwin Road; telephone (919) 490-9081. The mailing address is Duke University, Box 90381, Durham, N.C. 27708-0381.

Duke University Wetland Center

Director: Curtis J. Richardson, *Professor, Nicholas School of the Environment*

The goal of the Duke University Wetland Center is to provide sound scientific knowledge that will lead to sustainable wetland functions and values for the nation and the world. The center works toward this goal by conducting, sponsoring, and coordinating research and teaching on critical wetland issues.

Perhaps no single environmental issue has so polarized public opinion as the protection of wetlands. Part land, part water, wetlands are ecosystems in which water level and low oxygen support a unique ecological habitat conducive to the development of specific plant and animal species. The hydrologic and biologic nature of wetlands

generally is poorly understood by the people expected to comply with wetland regulations. Many people are unaware of the connections between surface water and groundwater, and the link between the two that wetlands often provide. Similarly, people often are not aware of the economic and ecological importance of wetlands in improving water quality, providing flood control, supplying habitat for commercial fisheries, supporting waterfowl and wading birds as well as the hunting and recreational values these ecosystems provide. Further complicating the issue of appropriate wetland resource management, people want both the unfettered right to use their own land and the right to use unpolluted waters.

By bringing together scientists and professionals, the Duke Wetland Center is able to focus attention on these and other wetland issues of regional, national, and international scale. Core researchers for the center are the director, faculty, visiting scholars and graduate students. As part of a professional school within a private university, the Duke Wetland Center works independently on wetland issues without the political pressures often brought to bear upon public institutions.

Selected current and proposed research activities are:

- Effects of agricultural runoff on Everglades nutrient cycling and storage
- Water management strategies to sustain ecological integrity of the Everglades
- Assessment of wetland ecosystem functional response to highways
- Restoration of salt marshes and the evolution of wetland structure and function over time
- Microbial and chemical transformations of mercury in the Florida Everglades: Factors controlling mobility and rates of methylation and demethylation
- Integrating ecological wetland functions and human wetland values
- Restoration of surface mined lands
- Functional assessment of constructed wetlands versus natural wetlands
- The history of vegetation cover, fire, hydroperiod and water depth in the wetlands over the past several hundred years
- Wetland hydrology, paleohydrology and hydrologic evolution

The Wetland Center is housed in the Levine Science Research Center on the Duke campus. The mailing address is Nicholas School of the Environment, Duke University, Box 90333, Durham, N.C. 27708-0333; telephone (919) 613-8008. The center also maintains an Everglades research laboratory near West Palm Beach, Florida.

Marine Biomedical Center

Director: Celia Bonaventura, *Professor, Nicholas School of the Environment*

The mission of the Duke University Marine/Freshwater Biomedical Sciences Center is to make use of marine or freshwater organisms in research, teaching and training efforts in areas of human and environmental health significance and to develop non-mammalian models and innovative methods for toxicological research. The primary objective is to increase scientific and public understanding of the molecular mechanisms that underlie adverse environmental effects associated with metals and free radicals. The center acts as a bridge between the marine science community, the diverse programs of the Nicholas School of the Environment, and the clinical and research arms of the Duke Medical School community. The center's core structure provides an integrative support system that facilitates a multilateral approach.

Center programs provide resources for feasibility studies, visiting scholars, seminars and workshops, development of nonmammalian models and innovative research methods, equipment maintenance and technical services, and a community outreach and education program. Through its programs the center provides cohesive support for

a network of interrelated projects that are peer reviewed and supported externally on an individual project basis. The center takes an active part in setting up exploratory studies for projects judged to fall within its mission, making use of facilities in Beaufort and on the Durham campus.

Studies at the center concern:

- Metals and metalloproteins
- Free radicals
- Gene regulation and development
- Environmental diagnostics
- Biomedicine/toxicology utilizing (a) nonmammalian models, (b) engineered systems, and (c) high-technology, innovative approaches

The mailing address is Marine Biomedical Center, Nicholas School of the Environment Marine Laboratory, 135 Duke Marine Lab Road, Beaufort, N.C. 28516-9721; telephone (919) 504-7508.

Alternative Educational Opportunities



Center for Environmental Education

Business leaders, environmental professionals, educators, and policy makers must be increasingly well trained in order to meet today's environmental challenges. As problems become more complex, learning must become a lifelong pursuit. Continuing environmental education programs must keep pace with the demands that confront business executives, professionals in environmental fields, and those who educate tomorrow's leaders.

The Center for Environmental Education in the Nicholas School of the Environment serves the needs of both professionals and educators for specialized continuing education on environmental topics. The center provides participants with information, experiences and quality instruction by offering multidisciplinary approaches utilizing Duke University's unique set of resources in environmental sciences, engineering, policy, and business. Collaborations with nearby universities are essential to the mission. A variety of continuing education intensive courses and workshops are offered throughout the year. Further information on programs offered through the center may be obtained from the school office.

Cooperative Colleges

The Cooperative College Program is designed to coordinate the education of students in selected undergraduate schools with graduate programs in the broad area of resources and environment offered at Duke. Students are accepted for either of two degrees, the Master of Forestry (M.F.) or Master of Environmental Management (M.E.M.). Although the program is designed to accommodate a wide range of undergraduate backgrounds, experience indicates that it is best suited to majors in one of the natural or social sciences, pre-engineering, business, natural resources, or environmental science.

The program accepts students after three years of undergraduate study. With appropriate guidance, highly qualified students can reach a satisfactory level of preparation for graduate work at Duke in three years of coordinated undergraduate study. The baccalaureate degree is awarded by the undergraduate school after the student has earned enough units at Duke to satisfy the requirements of the undergraduate institution. Minimum time required to complete the bachelor's degree is two full-time semesters at Duke. After four semesters at Duke, in which a minimum of 48 units of credit is earned, students may qualify for one of the professional master's degrees.

A student interested in entering the Cooperative College Program should apply to one of the participating schools, a list of which is available from the Nicholas School of the Environment enrollment services office. Each can provide information on courses of

study and bachelor's degree requirements. Students applying for admission to Duke after the third year of study should do so by 1 February of the third year. Applicants from the participating schools are considered regular applicants for admission and are judged by the same criteria; therefore, students should submit application forms, transcripts, letters of recommendation, and results of the Graduate Record Examination. If the student is applying for a 3-2 program, he or she must also submit a letter from the undergraduate dean approving the application.

Duke/UNC Oceanographic Consortium

The Duke/University of North Carolina Oceanographic Consortium operates a 135-foot oceanographic research vessel, the R/V *Cape Hatteras*. The ship operates both on the continental shelf and in the deep sea in the western North Atlantic, concentrating in the region between Nova Scotia and the Caribbean. The ship is a member of the academic research fleet supported by the National Science Foundation for the purpose of providing oceanographic research opportunities to investigators. R/V *Cape Hatteras* is used for training at sea by the universities that make up the Oceanographic Consortium (Duke, North Carolina State, UNC-Chapel Hill, UNC-Wilmington, UNC-Greensboro, and East Carolina). The consortium also manages the acquisition and maintenance of oceanographic instrumentation used aboard the R/V *Cape Hatteras*, and holds annual meetings of ocean sciences staff and graduate students from member institutions. These meetings are held at the Nicholas School of the Environment Marine Laboratory.

Forest History Society

Founded in 1946, the Forest History Society is a nonprofit, nonadvocacy organization committed to balanced and objective investigations of human interaction with the forest environment through time. Although its major focus is North America, the society is involved with a network of forest historians worldwide. In 1984, it became affiliated with Duke University and moved its headquarters to Durham.

The society emphasizes the utility of history to decision making in both the public and private sectors. The society believes that most currently held opinions are strongly influenced by perceptions of the past and that a clear understanding of what really happened, as today's issues evolved, is a vital component in the process of making prudent choices.

Five major emphases enable the society to achieve its goals: *Forest & Conservation History*, research and publication, archival collecting, library and reference, and service and professional outreach.

Environmental History is co-published quarterly with the American Society for Environmental History. Its refereed articles, book reviews, and bibliographic listings enable investigators to keep current with the field. Research and publications, supported largely by grants, focus on topics that are important today and are also significant historically. Among the current topics are the history of forest resource technology, forest economics, sustained-yield forestry, forestry on Native American lands, wood as an energy source, forest taxation, labor relations in the forest industries, and industrial forestry research.

The collection of archival materials has been a major effort since the society was founded. Included in the archives are the records of the American Forest Institute, National Forest Products Association, and the Society of American Foresters. The society's library and reference staff provide convenient access to the extensive literature of the field. Students and faculty of the university are welcome to use these valuable resources. The service and outreach emphasis enables society staff to be active participants in their professions. Included are teaching and advising assignments at the Nicholas School of the Environment.

Inquiries regarding the facilities and services offered by the society may be addressed to Executive Director, Forest History Society, 701 Vickers Avenue, Durham, N.C. 27701; telephone (919) 682-9319.

Integrated Case Studies

The case study approach to graduate education affords the student an opportunity to develop analytical and management skills through a close look at problems in resource and environmental management and policy. Case studies are used in class instruction in both traditional and intensive courses in several of the school's study areas.

In addition to utilizing completed case studies as course materials, students also have the opportunity to participate in the research and preparation of new case studies. The process of case preparation brings one in contact with professionals, businessmen, and others and offers a bridge between the academic curriculum and practical experience. This experience and the contacts made in the process of case research are valuable assets in securing employment.

The case studies are termed "integrated" case studies in natural resource analysis because they result from the cooperative efforts of a team of investigators comprising resource-ecologists, -economists, and -planners, as well as political scientists, sociologists, and others. The team approach is used in recognition of the fact that the successful analysis and resolution of the nation's complex resource and environmental problems requires a holistic perspective. Optimally, this results in an exploration of the full ramifications of utilizing natural resource systems.

Case study formats have varied. For example, projects have resulted in color and sound 16mm films, simulation games and workshop/conferences, as well as written reports. Typical issues addressed by past case studies include highway siting, hazardous waste disposal, back country management, use of herbicides in forest management, and the development and management of wetlands.

Financial assistance, in the form of research fellowships, is available to qualified students interested in case study analysis. Up to 6 units of academic credit may be earned for case study work. Proposals for case studies are developed in consultation with the student's faculty adviser and the case studies director, Curtis J. Richardson.

Integrated Toxicology Program

The Nicholas School of the Environment participates in Duke University's graduate program in toxicology. The Integrated Toxicology Program operates under a specific charter to develop holistic and innovative approaches to toxicology training for Ph.D. students and postdoctoral fellows.

Research in environmental toxicology within the Nicholas School of the Environment focuses on molecular and biochemical aspects of pollutant metabolism, adaptation, and modes of toxic action. The majority of this work employs freshwater, marine, and terrestrial organisms as toxicological models. The goals of toxicological research in the school are to achieve a fundamental understanding of processes governing the fates and effects of contaminants in ecosystems, and to elucidate linkages between human and ecosystem health. In order to achieve this goal, the curriculum and research activities of the program are designed to teach students the principles and methodologies of environmental chemistry, biochemistry, molecular biology, pathology, toxicology, ecology, and quantitative analysis. Upon completion of studies, the student is experienced in the design, execution and interpretation of current research in environmental toxicology. Completion of this training program at the Ph.D. level provides career opportunities in academia, industry, and research laboratories.

Training in environmental toxicology is also available to professional students in the Nicholas School of the Environment through the Master of Environmental Manage-

ment program in environmental toxicology, chemistry, and risk assessment. M.E.M. students have access to courses in the Integrated Toxicology Program curriculum and receive training appropriate for careers in industry, consulting firms, and government agencies concerned with the understanding and management of hazardous substances.

Students seeking admission to the program as a Ph.D. candidate make initial application to the Graduate School for admission to participating departments, including the Department of the Environment. Fellowships are available to outstanding students.

Intensive Courses

Through the Center for Environmental Education, the Nicholas School of the Environment offers a series of continuing education intensive courses that are appropriate for both practicing professionals and advanced full-time students who are pursuing careers in resource management, policy, and environmental science. The intensive courses are designed to allow regular students to blend theory with practical experience as well as to allow experienced professionals to update theory and methodology. Recognized subject matter specialists provide instructional resources not normally available to the university community. The result is an enriched educational experience through the exchange of ideas and information by participants of diverse backgrounds.

The continuing education intensive courses are organized into week-long modules. A course consists of one or two modules, each a discrete unit of study which may be taken alone for credit. In two-part courses, however, the first week may be a prerequisite to the second.

Based on available space, Nicholas School of the Environment students (M.F. and M.E.M. degree candidates) may register for the intensive courses two weeks prior to the first day of the course on a first-come, first served basis; students in their second year of study are given priority. One unit of credit may be earned for each week of an intensive course. Students may not register for more than two intensive courses in a semester without special permission from their adviser and the continuing education program director.

Courses in the continuing education intensive course series are listed in a special section in the chapter "Courses of Instruction" in this bulletin. A brochure containing complete information on the courses to be offered during a semester may be obtained from the school office.

Interaction with Professionals

Using discretionary funding from a variety of sources, the Nicholas School of the Environment sponsors a Distinguished Visitor Series to bring outstanding guests to visit the school. The major focus of the visitor's day on campus is a seminar on current environmental and natural resource management concepts, practices, and policy. Topics and speakers are selected in accordance with interests of faculty and students to reflect national and international issues. Speakers are drawn from the senior administrative ranks of public agencies, industries, nonprofit organizations, and the consulting field. Each presentation is accompanied by an informal luncheon or small group meetings with students and faculty, which permit continued discussion.

In addition to the Distinguished Visitor Series, the grants help to support other courses and activities that meet the objective of the exchange of ideas between practicing natural resource professionals and university students and faculty. These activities include an environmental seminar series, a forest utilization field trip to industry facilities in the South, and a western field trip.

The school recognizes the importance of graduate and professional student participation in professional organizations and makes available a limited amount of discretionary funding for activities that enhance the student's educational experience. Grants

are available on a competitive basis for individuals who wish to attend or present papers at conferences and scientific meetings.

International Studies

The Nicholas School of the Environment has a history of contribution to international education and research. Graduates of the school, many of them foreign nationals, hold significant positions in many countries in multinational corporations, United States government agencies, or resource and conservation organizations that have global responsibilities. Members of the faculty have served overseas in programs of teaching and research, in both the developed and developing parts of the world.

The contemporary need for greater attention to international studies has led the school to develop professional associations and curriculum options for students who wish to combine international interests with study of natural resources and the environment. Duke University is a member of the South Atlantic States Association for Asian and African Studies and the Organization for Tropical Studies. On campus, an active Center for International Studies, Center for Tropical Conservation, and Center for International Development Research provide a rich array of educational and research opportunities with global emphasis. Within the Nicholas School of the Environment there is an active student international environmental study group. The potential exists for student participation in international projects through competition for grants and fellowships. In addition, students in the school may elect area studies or languages to further their understanding of global issues and cultures.

The school welcomes foreign students and considers an international student body of value to the learning environment. Qualified foreign students in Trinity College and in graduate and professional schools of the university are admitted to courses in the school, subject to the approval of the student's adviser and the course instructor.

Internships

An internship with a public agency, corporation, consulting firm, or conservation organization is a valuable part of graduate professional education. The Nicholas School of the Environment Office of Career Services works with natural resource professionals to develop paid intern opportunities for professional and graduate degree candidates. Most students pursue internships during the summer between their first and second years of study, although internships may be taken at other times and for a longer duration. Many students use the intern experience as a basis for the master's project. Further information may be obtained from the school office.

Professional Skills Development

In addition to regular courses and seminars, the Nicholas School of the Environment offers a series of optional "professional development" lectures and workshops to prepare students for professional employment. Topics for these modules include field and laboratory techniques, communications skills, project organization and management, and teamwork skills. The schedule and detailed information concerning the series is made available to students during the academic year by the director of professional studies. A modest amount of credit is available for participation in these modules.

Career Planning and Placement



Career Services

The Nicholas School of the Environment operates its own Office of Career Services for all graduate and professional students and alumni of the school. Assistance is given to students in finding summer employment and internships, permanent employment upon graduation, and mid-career changes of employment.

Career Planning Seminars. Individual counseling and group workshops are provided by a professional staff member to assist students in the development of job search strategies and skills, resume preparation, and interviewing techniques. Presentations by alumni of the school enable students to discuss employment options with practicing natural resource professionals.

Internships. Although the Nicholas School of the Environment does not require internships, students are strongly encouraged to explore career options and enhance their professional training through paid internships with public or private sector natural resource employers. The Office of Career Services has information on a variety of options that students may consider when arranging practical training. See also the section on internships in the chapter, Additional Educational Opportunities.

Job Search Assistance. The Office of Career Services maintains a current listing of employment opportunities from private industry; local, state, and federal governments; universities; and nonprofit organizations. Career planning and placement resource materials are housed in the office. Both current students and graduates are encouraged to use the alumni network established to offer placement assistance.

A resume book is published annually by the school and distributed nationally to potential employers. Students are encouraged to prepare and submit resumes, with the assistance of the staff, for publication. Employer response to the resume book has been favorable, and many students have received initial contacts and invitations to interviews as a result.

The career services office also invites representatives from a number of firms and government agencies from throughout the country to visit the school to interview students for internships and permanent positions. Students are strongly urged to begin formulating their job-hunting strategies and implementing the job search at least six months prior to graduation.

Employment Offers. The success experienced by degree candidates in securing employment serves as a strong testimony to the value of graduate/professional study at Duke. Students are advised to gear their education to a specialized area in order to increase their marketability. Toward this goal, every effort is made to assist each student



in securing a paid summer internship appropriate to his or her field of study and geographic preference. Summer placements with local organizations may be continued as part-time positions during the student's second year of study, adding to the base of professional experience.

Beginning salaries vary, depending upon the educational specialization, capabilities, and prior experience of the candidate as well as the type of organization and geographical region in which he or she is employed. For recent graduating classes, beginning salaries have ranged from \$24,000 to \$50,000 annually with candidates having some prior experience and/or advanced quantitative skills commanding the higher figures.

Graduates of the school have an excellent record of finding challenging, satisfying employment within their areas of interest. A large percentage of recent graduates have accepted positions with industry and environmental consulting firms. Others work with government agencies, nonprofit organizations, and international development organizations.

The market for natural resource managers is expanding. In both the private sector, where environmental divisions are being established within traditional corporations, and in the public sector, where policy-making bodies increasingly face environmental concerns, Environment graduates are hired in research, planning, administrative, and consulting capacities. To a smaller degree, international organizations utilize natural resource managers; students interested in international employment usually benefit from experience such as that gained through the Peace Corps. The following is a list of selected organizations with which graduates of the past several years are affiliated.

ABT Associates
 American Rivers
 BASF Corporation
 Battelle, Pacific Northwest Laboratories
 Boise Cascade Corporation
 Booz, Allen and Hamilton, Inc.
 Camp, Dresser and McKee, Inc.
 Canal Forest Resources
 Champion International Corporation
 Chemonics
 ChemRisk
 Chesapeake Bay Foundation
 Conservation Law Foundation
 Consulting Services, Inc.
 Dames and Moore
 Duke Energy
 Duke University, School of the Environment
 Duke University, Office of Occupational and
 Environmental Safety
 E&A Engineering and Science
 Ecology and Environment, Inc.
 E. I. du Pont de Nemours and Company
 ENSR Consulting
 ERM, Inc.
 Environ, Inc.
 Environmental Defense Fund
 Florida Game and Fish Commission
 Ford Foundation
 Freshwater Institute
 General Motors
 Georgia Coastal Zone Management
 Great Lakes Protection Fund
 Hancock Timber Resource Group
 Hubbard Brook Experiment Station
 ICF, Inc.
 Industrial Economics
 Inform
 International Paper Company
 Maine State Planning Office
 MacArthur Foundation
 Malcolm Pirnie, Inc.
 Massachusetts Division of Water Supply
 McLaren/Hart
 Merck & Company, Inc.
 Metcalf and Eddy
 Midwest Research Institute
 National Oceanic and Atmospheric
 Administration
 National Recycling Coalition
 The Nature Conservancy
 City of New York, Department of
 Environmental Protection
 North Carolina Coastal Federation

North Carolina Cooperative Extension Service
 North Carolina Department of Environment,
 Health and Natural Resources
 North Carolina Sea Grant
 North Carolina Wildlife Resources
 Commission
 Oak Ridge National Laboratory
 Oregon State University
 Organization of American States
 Pacific Gas and Electric Company
 PRC Environmental, Inc.
 Procter and Gamble, Inc.
 Project Performance Corporation
 Radian Corporation
 Rain Forest Alliance
 Research Triangle Institute
 Resources for the Future
 Roy F. Weston, Inc.
 SAIC
 Shaklee Corporation
 South Carolina Water Resources Commission
 Southern Natural Gas Company
 Sprint Mid-Atlantic
 TetraTech, Inc.
 Teton Field School
 Texaco, Inc.
 Texas Land Office
 TRC Environmental
 United States Agency for International
 Development
 United States Department of Agriculture,
 Forest Service
 United States Department of Agriculture
 Economic Research Service
 United States Department of the Army
 United States Department of the Interior,
 National Park Service
 United States Environmental Protection
 Agency
 United States Peace Corps
 Versar
 Virgin Islands Biosphere Reserve
 Virginia Department of Forestry
 Wagner Timberlands
 Washington Department of Natural Resources
 Westvaco Corporation
 Weyerhaeuser Company
 Woodward-Clyde Consultants
 World Health Organization
 World Resources Institute
 World Wildlife Fund
 Worldwatch Institute

Student Life



Housing

While limited housing is available on campus, most students in the Nicholas School of the Environment join the annual scramble to find a place to live off campus. The university is very much a part of the urban environment that is Durham, but the campus is not an urban one. It is not traversed by streets with housing and businesses. Consequently the perimeter of the West Campus is densely developed with apartment complexes, and the East Campus is adjacent to a neighborhood of large, early twentieth-century homes, some of which have been converted to apartments. Free bus service is available between the two campuses.

The Department of Housing Management operates an off-campus housing service which consists of a staff person who maintains listings of apartment openings, house rentals, and "roommates wanted." The off-campus housing service does not rate the quality of apartments, houses, or landlords, nor arrange viewings. Similarly, the Office of Enrollment Services in the Nicholas School of the Environment maintains a listing of houses and apartments popular with students in the school as well as a list of entering students who are interested in finding roommates. These lists are mailed to students during the summer.

Services for Students

Medical Care. The main components of the student health service include the University Health Services Clinic, located in the Pickens Building on West Campus, and the student infirmary in Duke Hospital South. Emergency transportation, if required, can be obtained from the Duke campus police. The facilities of the university health services clinic are available during both regular and summer sessions. The facilities of the student infirmary are available only from the opening of the university in the fall until graduation day in the spring.

The student health fee is nonrefundable after the first day of classes. Students may be covered during the summer for an additional charge. Dependents and family members are not covered at any time.

The resources of the Medical Center are available to all students and their spouses and children. Charges for all services received from the Medical Center are the responsibility of the student.

The university has an Accident and Sickness Insurance Plan available for full-time students. Although participation in this plan is voluntary, the university expects all graduate students to be financially responsible for medical expenses above those covered by the student health service. Students who have medical insurance or wish to accept the financial responsibility for any medical expense may elect not to join the Accident and Sickness Insurance Plan by signing a statement to this effect. Each full-time student in residence must purchase this student health insurance or indicate the alternative arrangement.

The Student Accident and Sickness Insurance Plan provides protection twenty-four hours a day during the twelve-month term of the policy. Students are covered on and off the campus, at home, while traveling, and during interim vacation periods. For additional fees a student may obtain coverage for a spouse or spouse and children. Term of the policy is from opening day in the fall.

Coverage and services are subject to change as deemed necessary by the university.

Counseling and Psychological Services. CAPS provides a comprehensive range of counseling and psychological services to assist and promote the personal growth and development of Duke students. The professional staff is composed of clinical social workers, psychologists, and psychiatrists experienced in working with young adults. Among services provided are personal, social, and academic counseling. A number of short-term seminars or groups focusing on skills development and special interests such as coping with stress and tension, fostering assertiveness, enriching couples' communication, and dealing with separation and divorce are also offered. A policy of strict confidentiality is maintained concerning each student's contact with the CAPS staff. Individual evaluation and brief counseling/therapy as well as skills development seminars are covered by student health fees. There are no additional charges to the student for these services.

Appointments may be made by calling 660-1000 or visiting CAPS, 214 Page.

Career Development Center. The Career Development Center, located in Page Building on West Campus, offers a number of integrated services that address a range of student needs from indecision about career choices to assistance with the post-graduate job search. Although many of the services are designed primarily for undergraduates, graduate and professional students are also encouraged to register with the center and use its resources as their career plans evolve.

Students who are unsure of their career plans can obtain confidential counseling to help them better understand themselves and clarify career goals. Individual appointments with counselors are available, as are group workshops, testing, and computerized career guidance programs.

The Career Resources Library, 217 Page, has resources to help students choose careers or further training and education, as well as self-help materials for improving study techniques, time management, test-taking and reading comprehension.

The Office of Placement Services, 110 Page, serves as a liaison between Duke students and potential employers. Services offered include placement seminars and workshops, on-campus interviewing opportunities with employers and graduate/professional schools, position vacancy notices, a library of employer resources, and individualized placement counseling. To participate in job interviews scheduled throughout the year, students must be registered with the office and have assembled a permanent file.

In addition, the school maintains its own Office of Career Services. For further information, see the Career Planning and Placement section in this bulletin.

International Adviser. The International House handles governmental matters for students from abroad such as statements of attendance for home governments, issuance

of United States immigration forms for re-entry into the country after a temporary absence, and required yearly extensions of time. Any new student who is not a citizen of the United States should report with passport to the international adviser soon after arrival. The International House is located at 2022 Campus Drive.

Other Services. The Bryan University Center houses an information desk, two drama theaters, a film theater, stores for books and supplies, meeting rooms, lounges, snack bars, and other facilities. A barbershop, hairdresser, post office, and bank are also located in the center and in the nearby West Campus Union.

Student Organizations and Activities

Sports. Students are welcome to use such recreational facilities as the swimming pools, tennis courts, golf course, track, jogging course, handball and squash courts, gymnasias, weight room, and playing fields. Intramural programs provide an opportunity to participate in informal and competitive physical activity. A variety of clubs for gymnastics, scuba diving, sailing, cycling, badminton, karate, rugby, soccer, and crew are also active.

FOREM Club. The FOREM Club is the student organization for coordination of the school's social functions, community service, and intramural team participation. FOREM is an acronym for Forestry and Environmental Management. Annual functions of the club include a Christmas party, Christmas tree sale, Field Day, and year-end banquet.

Student Advisory Committee. The Student Advisory Committee, an elected student group in the Nicholas School of the Environment, meets regularly with the dean and faculty representatives to discuss courses and curriculum, programs, and long-range goals of the school.

Graduate and Professional Student Council. The Graduate and Professional Student Council is the university-wide representative body for students registered in the various professional schools and departments of the Graduate School. The council provides a means of communication among graduate students, presents graduate student concerns to the administration, and selects students for membership on university committees. Representatives from the Nicholas School of the Environment are elected annually by the student body.

Professional and Scientific Societies. Students are encouraged to participate in one or more professional or learned societies appropriate to their academic interest. Many of these societies are interested in participation by students and offer a lower fee to encourage student membership. Student chapters of the Society of American Foresters, International Society of Tropical Foresters, National Association of Environmental Professionals, and the American Water Resources Association are active in the school.

Religious Services. Interdenominational services are conducted on Sunday mornings in Duke Chapel. Roman Catholic masses are offered daily on campus. Several Protestant denominations have student centers on campus. The Divinity School conducts other chapel services and religious and social activities. There is also a Hillel group which meets regularly.

Cultural Activities. Concerts, recitals, lectures, plays, films, and dance programs are presented frequently on campus. Information on major events is available at Page Box Office or the Bryan Center information desk. The University Museum of Art, which has some excellent permanent collections, is located on East Campus.

Courses of Instruction



Course offerings are subject to change. The student should consult the current university course schedule for listings of courses to be offered each semester.

General Courses

200. Integrated Case Studies. A group of two to four students may plan and conduct integrated research projects on a special topic, not normally covered by courses or seminars. A request to establish such a project should be addressed to the case studies director with an outline of the objectives and methods of study and a plan for presentation of the results to the school. Each participant's adviser will designate the units to be earned (up to six units) and evaluate and grade the work. Variable credit. *Staff*

201. Forest Resources Field Skills. Introduction to field techniques commonly used to quantify and sample forest resources: trees, soils, water, and animal resources. Dendrology, vegetation sampling, soil mapping, river flow estimation, field water quality sampling, surveying, and use of compass. 2 units. *Davison and Richter*

204. Forest Inventory, Growth, and Yield. Measurement of land and forests for purposes of management, appraisal, purchase, and sale. Techniques for predicting the growth and future yield of stands by various methods. 3 units. *Davison*

205. Ecological Management of Forest Systems (Silviculture). The aim of the course is to equip future resource managers and environmental consultants with knowledge allowing them to propose lower impact practices to individuals and organizations who need to balance wood production with maintenance of environmental quality. Underlying principles of growth, from seed to mature trees, and stand dynamics are explored. Various alternative methods of manipulating growth, stand structure and development, ranging from little to large perturbations of forest systems, are presented and assessed in terms of their effect on resource quality. 3 units. *Oren*

205L. Ecological Management of Forest Systems (Silviculture). Same as 205 with laboratory. 4 units. *Oren*

207. Forest Pest Management. Fundamentals of entomology and plant pathology as appropriate to understanding the impacts of insects and diseases on forest productivity and their assessment for integration into forest management. Regional case examples and complexes are evaluated in terms of pest-population, forest-stand dynamics; economic and societal constraints; treatment strategies; monitoring systems; and benefit-cost analysis. This approach seeks to develop predictive capabilities in long-range pest management and decision making. 3 units. *Stambaugh*

207L. Forest Pest Management. Same as 207 with laboratory which is largely field oriented to focus on diagnostics and impact analysis. 4 units. *Stambaugh*

208L. Estuarine Ecosystem Processes. A study of the physical, chemical, and biological processes that control the structure of estuarine communities. Emphasis on field and laboratory techniques and data interpretation. (Given at Beaufort.) Prerequisite: ecology, systematics, or field biology course or consent of instructor. C-L: Marine Sciences. 4 units. *Kirby-Smith*

211. Applied Ecology and Ecosystem Management. An application of ecological principles to applied resource and environmental problems with an emphasis on the ecosystem as a basic working unit. Perspectives include such topics as land/water interactions, the patchiness concept, succession, energy flow, productivity, mineral cycling, perturbation effects on ecosystems, and limiting factors. Prerequisites: introductory courses in biology and ecology. 3 units. *Richardson*

212. Environmental Toxicology. Study of environmental contaminants from a broad perspective encompassing biochemical, ecological, and toxicological principles and methodologies. Discussion of sources, environmental transport and transformation phenomena, accumulation in biota and ecosystems. Impacts at various levels of organization, particularly biochemical and physiological effects. Prerequisites: organic chemistry and vertebrate physiology or consent of instructor. 3 units. *Di Giulio*

213. Forest Ecosystems. Emphasis on the processes by which forests circulate, transform, and accumulate energy and materials through interactions of biologic organisms and the forest environment. Ecosystem productivity and cycling of carbon, water, and nutrients provide the basis for lecture and laboratory. 3 units. *Richter*

214. Landscape Ecology. Emphasis on the role of spatial heterogeneity in terrestrial systems: its detection and description, agents of pattern formation, landscape dynamics and models, and the implications of heterogeneity of populations, communities, and ecosystems. Prerequisites: equivalents of Environment 211, 251, and 351, or consent of instructor. 3 units. *Urban*

215. Environmental Physiology. Examination of tolerance, limiting factors, nutrition, and other ecological physiology concepts used in evaluating plant responses to multiple environmental stresses. Discussion of procedures for and examples of monitoring physiological responses to environmental perturbations and resource manipulation. 2 units. *Oren*

216. Applied Population Ecology. Population dynamics of managed and unmanaged populations. A quantitative approach to exploitation and conservation of animal and plant populations, including harvesting, population viability analysis, population genetics. Prerequisites: introductory statistics, calculus, and computer programming or consent of instructor. 3 units. *Maguire*

217. Tropical Ecology. Ecosystem, community, and population ecology of tropical plants and animals with application to conservation and sustainable development.

Prerequisite: a course in general ecology. C-L: Biology 215, Botany 215, and Zoology 215. 3 units. *Terborgh*

218L. Barrier Island Ecology. An integration of barrier island plant and animal ecology within the context of geomorphological change and human disturbance. Topics include: barrier island formation and migration, plant and animal adaptations, species interactions, dune succession, maritime forests, salt marshes, sea level rise, conservation policy, and restoration ecology. Field trips to many of the major North Carolina barrier islands. Strong emphasis on field observation and independent research. (Given at Beaufort.) Prerequisite: Biology 25L or equivalent; suggested: course in botany or ecology. C-L: Biology 218L, Botany 218L, and Marine Sciences. 6 units. *Evans, Peterson, and Wells (visiting summer faculty)*

219L. Marine Ecology. Factors that influence the distribution, abundance, and diversity of marine organisms. Course structure integrates lectures, field excursions, and independent research projects. Topics include characteristics of marine habitats, adaptation to environment, species interactions, biogeography, larval recruitment, rocky shores, marine mammals, fouling communities, tidal flats, beaches, subtidal communities, and coral reefs. Open to undergraduates only under Biology 129L. Four units (fall and spring); six units (summer). (Given at Beaufort.) Prerequisite: none; suggested—introductory ecology, invertebrate zoology, or marine botany. C-L: Marine Sciences and Zoology 203L. Variable credit. *Staff*

220. Vegetation Management in Urban Ecosystems (Urban Forestry). Biology and management of woody vegetation, especially trees, across the urban-forest continuum. Special uses and problems of the urban forest are discussed in terms of socioeconomic, legal, arboricultural, and environmental considerations. Management case studies and field trips will be used to gain insights into tree valuation, inventory, and municipal ordinances and administration. 3 units. *Stambaugh*

221. Soil Resources. Emphasis on soil resources as central components of terrestrial ecosystems, as rooting environments for plants, and as porous media for water. Soil physics and chemistry provide the basis for the special problems examined through the course. Laboratory emphasizes field and lab skills, interpretive and analytical. 3 units. *Richter*

222L. Physical Processes in Coastal Environments. The physical processes on beaches, the inner continental shelf, and in estuaries, in the context of their implications for the biological and geological environments. Topics to be drawn from the origin of waves and currents, tides, turbulence and mixing transport of sand and larvae. Applications to biomechanics and coastal erosion, and to marine ecology, coastal zone management, and water quality. (Given at Beaufort.) Prerequisites: Mathematics 31 and 32. C-L: Geology 201L and Marine Sciences. 4 units. *Staff*

223L. Behavioral Ecology. How ecological factors shape foraging, mating, aggressive, and social behavior. Laboratory experiments and field observations from the Outer Banks environment. Independent projects and seminars. Not open to undergraduates. (Given at Beaufort.) Prerequisite: introductory biology (Biology 25L). C-L: Marine Sciences and Zoology 213L. 6 units. *Rubenstein (visiting summer faculty)*

225L. Coastal Ecotoxicology and Pollution. Principles of transport, fates, food-web dynamics and biological effects of pollutants in the marine environment. Laboratory to stress standard techniques for assessing pollutant levels and effects. (Given at Beaufort.) Prerequisites: introductory chemistry and biology. C-L: Marine Sciences. 4 units. *Kenney*

226. Marine Mammals. Ecology, social organization, behavior, acoustic communication, and management issues. Focused on marine mammals in the southeastern United States (for example, bottlenose dolphin, right whale, West Indian manatee). Only

open to undergraduates under Biology 126. (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. 3 units. *Read or staff*

226L. Marine Mammals. Same as Environment 226 with laboratory. Laboratory exercises will consider social organization and acoustic communication in the local bottlenose dolphin population. (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. 4 units. *Read or staff*

228L. Physiology of Marine Animals. Environmental factors, biological rhythms, and behavioral adaptations in the comparative physiology of marine animals. Not open to undergraduates. Four units (fall); six units (summer). (Given at Beaufort.) Prerequisites: introductory biology and chemistry. C-L: Marine Sciences. Variable credit. *Forward*

229L. Biochemistry of Marine Animals. Functional, structural, and evolutionary relationships of biochemical processes of importance to marine organisms. Not open to undergraduates. Four units (fall and spring); six units (summer). (Given at Beaufort.) Prerequisite: Biology 25L; Chemistry 11L, 12L. C-L: Marine Sciences. Variable credit. *Rittschof*

230L. Weather and Climate. Overview of the science of meteorology and principles of climatology, especially as applied to problems in ecology and natural resource management. Emphasis on the processes and characteristics of weather phenomena and local and regional climates. General introduction to sources of climatic data and climatic data analysis. Includes laboratory. 4 units. *Knoerr*

232. Microclimatology. Introduction to the micrometeorological processes. Discussion of the integration of these processes and the resulting microclimates in the rural (forest, field, and water surface) and urban environments. Methods for modification of the microclimate. Offered on demand. C-L: Biology 232 and Botany 232. 3 units. *Knoerr*

234L. Watershed Hydrology. Introduction to the hydrologic cycle with emphasis on the influence of land use, vegetation, soil types, climate, and land forms on water quantity and quality and methods for control. Development of water balance models. Analysis of precipitation patterns, rainfall and runoff, and nonpoint source impacts. Statistical handling and preparation of hydrologic data, simulation and prediction models, introduction to groundwater flow, laboratory and field sampling methods. 4 units. *Katul*

235. Air Quality Management. Types, sources, effects of air pollutants. Regulatory framework emphasizing the Clean Air Act Amendments of 1990 and federal, state, local agency implementation. Application of risk assessment, technology, market incentives to air management. Scientific, policy aspects of acid deposition, global climate change, indoor air, mobile sources control. Dispersion modeling, exposure assessment. 3 units. *Vandenberg*

236. Water Quality Management. Types, sources, and effects of pollutants. Water quality standards and criteria. Engineering approaches to water management. Mathematical models and their application to water quality management. Federal regulations, in particular, the Federal Water Pollution Control Act and the Safe Drinking Water Act. Policy analysis for water quality management planning. 3 units. *Reckhow*

240. Fate of Organic Chemicals in the Aquatic Environment. Kinetic, equilibrium, and analytical approaches applied to quantitative description of processes affecting the fate of anthropogenic and natural organic compounds in surface and groundwaters and in selected treatment processes, including sorption phenomena, gas transfer, hydrolysis, photochemistry, oxidation-reduction, and biodegradation. Sampling, detection, identification, and quantification of organic compounds in the environment. Gas and liquid

chromatography and mass spectrometry. Prerequisites: university-level general chemistry and organic chemistry within last four years. C-L: Civil Engineering 240. 3 units. *Dubay*

241. Atmospheric Chemistry and Air Pollution. Chemical kinetics and equilibrium applied to the mechanistic and quantitative description of processes affecting the fates of anthropogenic and natural chemicals in the troposphere, on local, regional, and global scales. Direct photolysis; gas-phase photo-formation and fates of ozone, radicals, and other oxidants; gas-phase oxidations of volatile organic compounds; gas-to-drop partitioning; aqueous-phase photoformation and fates of hydrogen peroxide, radicals, and other oxidants in the aqueous phases of clouds, fogs, and aerosols; effects of aqueous-phase reactions on the chemical composition of the troposphere; gas-phase and aqueous-phase oxidations of organic and inorganic compounds; stratospheric ozone depletion. Prerequisites: university-level general chemistry and organic chemistry within last four years. C-L: Civil Engineering 241. 3 units. *Staff*

242. Environmental Aquatic Chemistry. Principles of chemical kinetics and equilibria applied to quantitative description of the chemistry of lakes, rivers, oceans, groundwaters, and selected treatment processes. Equilibrium, steady state, and other kinetic models applied to processes such as the carbonate system, coordination chemistry, precipitation and dissolution, oxidation-reduction, photochemistry, adsorption, and heterogeneous reactions. Prerequisite: university-level general chemistry within last four years. C-L: Civil Engineering 242. 3 units. *Staff*

243. Environmental Biochemistry. Introduction to the (macro)molecules of life and fundamental metabolic pathways. Topics are presented in the context of environmental perturbations. Fundamental aspects of energetics, proteins, enzymes, carbohydrates, lipids, and nucleic acids. Emphasis on mechanisms of adaptation, molecular controls, and responses to toxicants. (Given at Beaufort.) Prerequisite: organic chemistry. C-L: Cell Biology 243 and Marine Sciences. 3 units. *C. Bonaventura*

244L. Molecular and Cellular Processes in Marine Organisms. Joint research projects on the adverse effects of environmental pollutants on marine organisms at the cellular and molecular level. Research methodologies include: spectroscopy (UV/VIS, fluorescence, and atomic absorption); subcellular fractionation; protein purification and characterization using chromatography and electrophoresis; analysis of pollutant-induced damage to proteins, membranes, and DNA; measurement of activity of enzymatic defense systems. Lectures cover molecular mechanisms of damage and damage control, and concepts that underlie the methods to be used. (Given at Beaufort.) Prerequisite: organic chemistry. C-L: Cell Biology 244L and Marine Sciences. 4 units. *C. Bonaventura and McClellan-Green*

245. Ecology of Microorganisms. Factors affecting the abundance, distribution, and behavior of microorganisms. Topics include microbial form and function, activities in the environment, and applications to current environmental issues. 3 units. *Staff*

246. Survey of Occupational Health and Safety. Occupational risks associated with biological, chemical, ergonomic, radiation, and toxic hazards. The nature and scope of occupational hazards, health effects, and risk assessment and management strategies. Open to undergraduates by consent. 3 units. *Staff*

247. Survey of Environmental Health and Safety. Environmental risks from the perspective of global ecology, biology, chemistry, and radiation. The nature and scope of environmental hazards, environmental impacts and health effects, and risk assessment and management strategies. Open to undergraduates by consent. 3 units. *Staff*

248. Solid Waste Engineering. Engineering design of material and energy recovery systems including traditional and advanced technologies. Sanitary landfills and incin-

eration of solid wastes. Application of systems analysis to collection of municipal refuse. Major design project in solid waste management. Prerequisite: Civil Engineering 124L or consent of instructor. C-L: Civil Engineering 248. 3 units. *Vesilind*

249. Environmental Molecular Biology. Introduction to molecular techniques and gene regulation as they apply to environmental issues. Topics include basic cloning strategies and methods, DNA/RNA/protein separation and hybridization, polymerase chain reaction, *in vitro* mutagenesis, and protein expression. Student presentations illustrate how molecular technologies such as the creation of genetically engineered organisms address environmental problems. Prerequisite: introductory biology. 3 units. *Freedman*

251. Statistics and Data Analysis in Biological Science. Elements of statistical inference and estimation including exploratory data analysis, regression, and analysis of variance. Emphasis on biological science applications. Not open to students who have had Mathematics 136 or Statistics 110A, 110B, 112, 113, 114, 210A, or 213. C-L: Statistics 210B. 3 units. *Staff*

252L. Statistics and Data Analysis in Earth and Ocean Science. Techniques commonly used by earth and ocean scientists for the analysis of spatial and/or temporal series of data. Topics include regression, Fourier analysis, nonparametric spectral analysis, and, perhaps, principal components analysis and parametric spectral estimators. (Given at Beaufort.) Prerequisites: Mathematics 31 and 32, Statistics 110 or 112, or consent of instructor. C-L: Geology 222L and Marine Sciences. 4 units. *Staff*

253. Environmental Applications of Biometry. Overview of statistical methods frequently used for the analysis of experiments in organismal and field biology. Topics include nonparametric statistical methods, analysis of frequencies, probit analysis of dose-response data, and the identification and application of statistical methods for specialized needs. Prerequisite: Environment 251 or equivalent. 3 units. *Staff*

255. Applied Regression Analysis. Linear regression using both graphical and numerical methods. Model construction, critique, and correction using graphical residual analysis. One-way and two-way analysis of variance; introduction to design of experiments. Use of a standard statistical software package. Applications and examples drawn from various sources, emphasizing the biological and environmental sciences. Prerequisite: Statistics 210B or equivalent. C-L: Statistics 242. 3 units. *Staff*

260. Western Field Trip. One-week trip to observe land management and utilization practices in the western United States. Exposure to ecological, economic, and policy issues, as well as watershed, wildlife, and land use questions. Consent of instructor required. 1 unit. *Staff*

261. Remote Sensing for Resource Management. An examination of remote sensing systems as sources of information in resource management with an emphasis on aerial photography and multispectral scanners. Emphasis on the interpretation of airborne and space imagery. 3 units. *Davison*

262. Forest Utilization Field Trip. Introduction to utilization in the managed forest and the principal wood-using industries. Taught as a one-week field seminar. May be taken by nonforestry majors. 1 unit. *Staff*

263. Environmental Economics: Theory and Application. Role of materials and energy balances in modeling production and consumption; externalities and Pigouvian taxes; property rights and open access resources; role of market structure; design of policy instruments and actual practice; contrasts between domestic and international environmental policies. Prerequisite: Economics 149. C-L: Economics 263. 3 units. *Smith*

264. Applied Differential Equations in Environmental Sciences. General calculus and analytic geometry review; numerical differentiation and integration; analytic and exact methods for first and second order ordinary differential equations (ODE); introduction to higher order linear ODE, numerical integration of ODEs and systems of ODEs; extension of Euler's method to partial differential equations (PDE) with special emphasis on parabolic PDE. Example applications include population forecasting, soil-plant-atmosphere water flow models, ground water and heat flow in soils, and diffusion of gases from leaves into the atmosphere. Prerequisite: Mathematics 31 or equivalent or consent of instructor. 2 units. *Katul*

266. Ecology of Southern Appalachian Forests. Field trips to various forest ecosystems in the southern Appalachian Mountains. Species identification, major forest types, field sampling, and history of effects of human activities. Consent of instructor required. 1 unit. *Richter*

268. Advanced Topics in Nearshore Processes. Advanced treatment of fluid processes in the nearshore. Topics drawn from nonlinear wave theory, radiation stresses and their gradients, forced and free infragravity waves, and the origins of mean currents in the surf zone. Other topics following students' interests. (Given at Beaufort.) Prerequisite: Environment 290, Mathematics 111 or 114, or consent of instructor. C-L: Geology 204 and Marine Sciences. 3 units. *Staff*

269S. Advanced Topics in Marine Ecology. Theoretical concepts from population, community, and evolutionary ecology will be linked to observations and experiments to enhance understanding of the structure and function of marine systems. Current topics in marine ecology (for example, marine food web dynamics, species interactions, life history strategies, fisheries ecology, conservation biology). Discussions will be based on readings from the primary literature with emphasis on developing critical and synthetic skills. Each student will prepare a research proposal in NSF format. May be repeated. (Given at Beaufort.) C-L: Marine Sciences. 2 units. *Crowder*

270. Resource and Environmental Economics. The application of economic concepts to private- and public-sector decision making concerning natural and environmental resources. Intertemporal resource allocation, benefit-cost analysis, valuation of environmental goods and policy concepts. Includes laboratory. Prerequisite: introductory course in microeconomics. C-L: Economics 270 and Public Policy Studies 272. 3 units. *Kramer*

271. Economic Analysis of Resource and Environmental Policies. Case and applications oriented course examining current environmental and resource policy issues. Benefits and costs of policies related to sustaining resource productivity and maintaining environmental quality will be analyzed using economic and econometric methods. Topics include benefit-cost analysis, intergenerational equity, externalities, public goods, and property rights. Prerequisite: Environment 270 or equivalent; Economics 149 recommended. C-L: Economics 272. 3 units. *Staff*

272. Evaluation of Public Expenditures. Basic development of cost benefit analysis from alternative points of view, for example, equity debt, and economy as a whole. Techniques include: construction of cash flows, alternative investment rules, inflation adjustments, optimal timing and duration of projects, private and social pricing. Adjustments for economic distortions, foreign exchange adjustments, risk and income distribution examined in the context of present value rules. Examples and cases from both developed and developing countries. C-L: Economics 261 and Public Policy Studies 261. 3 units. *Conrad*

273. Marine Fisheries Policy. Principles, structure, and process of public policy-making for marine fisheries. Topics include local, regional, national, and international

approaches to the management of marine fisheries. A social systems approach is used to analyze the biological, ecological, social, and economic aspects of the policy and management process. (Given at Beaufort.) C-L: Marine Sciences. 3 units. *Orbach*

274. Resource and Environmental Policy. Development of a policy analysis framework for studying resource and environmental policy. Political institutions, interest group theory, public choice theory, role of economics in policy analysis, ethics and values. Application to current and historical U.S. policy issues. Prerequisite: Environment 270, Public Policy Studies 272, or consent of instructor. C-L: Public Policy Studies 274. 3 units. *Staff*

276. Marine Policy. Formal study of policy and policy-making concerning the coastal marine environment. History of specific marine-related organizations, legislation, and issues and their effects on local, regional, national, and international arenas. Topics explored through use of theoretical and methodological perspectives, including political science, sociology, and economics. Consent of instructor required. (Given at Beaufort.) C-L: Marine Sciences and Public Policy Studies 197. 3 units. *Orbach*

277. Conservation and Sustainable Development I: Concepts and Methods. Ag-economic, ecological, and economic concepts of sustainability, with emphasis on application in developing countries; forest, soil, and wildlife resources; models in conservation biology; historical, cultural, and sociological perspectives; policy analysis. 3 units. *Staff*

278. Conservation and Sustainable Development II: Integrated Problem Solving. Approaches to reconciling conservation and development, with emphasis on developing countries. Case studies; project formulation, implementation, and evaluation; institutional policy formation; conflict resolution. 3 units. *Staff*

282S. Environmental Ethics. Selected topics involving values and the environment, for example, extending morality to nature, rights of future generations, environmental aesthetics, diversity and stability, ideological biases in ecological knowledge. Consent of instructor required. C-L: Philosophy 289S. 3 units. *Cooper*

283. Corporate Environmental Management and Strategy. Examines management theories, frameworks, tools, and concepts which can be used to understand the interactions of corporations with the natural environment. Topics include industrial ecology, design for the environment, product stewardship, corporate environmental policies, stakeholder relationships, business/not-for-profit partnerships, green marketing, managing international operations, environmental communication, and sustainability. Variable credit. *Lober*

285. Land Use Principles and Policy. Consideration of four major roles of land in the United States: as a producer of commodities, financial asset, component of environmental systems, and location of development. Analysis of market allocation of land, market failure, role of public planning and regulation. C-L: Public Policy Studies 285. 3 units. *Healy*

290. Physical Oceanography. Introduction to the dynamic principles of ocean circulation with an emphasis on large temporal and spatial scales of motion. Topics include wind-driven and density-driven flow, western boundary intensification, mid-ocean, shelf, and tropical circulations. Prerequisites: Mathematics 31 and 32 or consent of instructor. C-L: Geology 203 and Mechanical Engineering 290. 3 units. *Lozier*

291. Geological Oceanography. The geology of ocean basins, including origin, bottom physiography, sediment distribution, and sedimentary processes. Not open to students who have taken Geology 206S. (Given at Beaufort.) C-L: Geology 205 and Marine Sciences. 3 units. *Staff*

292L. Biological Oceanography. Physical, chemical, and biological processes of the oceans, emphasizing special adaptations for life in the sea and factors controlling distribution and abundance of organisms. Not open to undergraduates. Four units (spring); six units (summer). (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. Variable credit. *Ramus or staff*

293. Analysis of Ocean Ecosystems. The history, utility, and heuristic value of the ecosystem; ocean systems in the context of Odum's ecosystem concept; structure and function of the earth's major ecosystems. Not open to undergraduates. (Given at Beaufort.) Prerequisite: one year of biology, one year of chemistry, or consent of instructor. C-L: Marine Sciences. 3 units. *Barber*

295L. Marine Invertebrate Zoology. Structure, function, and development of invertebrates collected from estuarine and marine habitats. Not open to students who have taken Biology or Zoology 274L. Not open to undergraduates. Four units (fall); six units (summer). (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. Variable credit. *Kirby-Smith*

297L. Biology of Marine Invertebrates. Systematic survey of the principal marine invertebrate taxa, with emphasis on structure, function, behavior, and ecology. Field trips and independent projects. Not open to undergraduates who have taken Biology 176L. (Given at Beaufort.) Prerequisite: introductory biology (Biology 25L). C-L: Biology 274L, Marine Sciences, and Zoology 274L. 6 units. *Dimock (visiting summer faculty)*

298. Special Topics. Content to be determined each semester. May be repeated. Variable credit. *Staff*

299. Independent Studies and Projects. Directed readings or research at the graduate level to meet the needs of individual students. Consent of instructor required. Units to be arranged. Variable credit. *Staff*

302. Models in Forest and Environmental Management. Students learn how to design and choose models for forestry and ecology. Emphasis on using models to develop strategy and evaluate options for culturing forests and related ecosystems. Subjects include timber, wildlife, water, recreation, and cash flow. 3 units. *Boyce*

303. Principles of Ecological Modeling. Design, implementation, analysis, and interpretation of ecological models. Combination of lectures, student-moderated discussions, and computer lab exercises. Prerequisites: Biology 110L or equivalent and Environment 251 or equivalent. C-L: Botany 303. 3 units. *Reynolds and Urban*

305. Harvesting Effects on Productivity. Impacts of harvesting on the residual stand, soil properties, water quality, and future site productivity. The integration of harvesting into overall stand management through a full rotation is stressed. Offered on demand. 2 units. *Davison*

307. Ecophysiology of Productivity and Stress. Exploration of principles governing stand growth and its response to a variety of stresses. Emphasis on climate, soil resources, and competition. Stresses and their reliefs determined by pollution and the availability of resources as modifiers of the physiological properties of trees. 3 units. *Oren*

312. Wetlands Ecology and Management. The study of bogs, fens, marshes, and swamps. Emphasis on processes within the ecosystem: biogeochemical cycling, decomposition, hydrology, and primary productivity. Ecosystem structure, the response of these systems to perturbations, and management strategies are discussed. A research project is required. Prerequisites: Environment 211 or equivalent and consent of instructor. 3 units. *Richardson*

313. Advanced Topics in Environmental Toxicology. Discussion of current issues. Topics vary but may include chemical carcinogenesis in aquatic animals; biomarkers for exposure and sublethal stress in plants and animals; techniques for ecological hazard assessments; and means of determining population, community, and ecosystem level effects. Lectures and discussions led by instructor, guest speakers, and students. Prerequisite: Environment 212. 3 units. *Di Giulio*

314. Integrated Case Studies in Toxicology. Students are assigned topics relative to their chosen research discipline in toxicology and are asked to develop case studies to present at a roundtable workshop. Emphasis on review and analysis of toxicological problems from a holistic (multidisciplinary) viewpoint. Offered on demand. C-L: Pharmacology 314. 1 unit. *Abou-Donia*

316. Case Studies in Environmental and Forest Management. Structured methods for environmental and resource problem solving, including benefit-cost, statistical, and decision analyses, as well as simulation and optimization, are applied to case studies. Previous course work provides a foundation for addressing ecological, economic, ethical, and sociopolitical aspects of management issues. Students work in teams to develop operational management plans which are presented in oral and written form. Prerequisite: Environment 211, 270, or 213 or equivalent, two quantitative courses, or consent of instructor. 4 units. *Maguire*

317. Topics in Tropical Ecology and Conservation. Discussion of current issues and ideas at the interface between basic and applied science. Lectures, seminars, and discussion with student participation. Prerequisite: Environment 217 or equivalent. 2 units. *Terborgh*

322L. Microbiology of Forest Soils. Ecology of the microbial populations of forest soils, with emphasis on rhizosphere interactions, root pathogenesis, and mycorrhizae. Includes laboratory. Offered on demand. Prerequisites: consent of instructor; mycology and bacteriology are recommended. 4 units. *Stambaugh*

330L. Environmental Monitoring and Instrumentation. Methods of measuring and monitoring the earth's physical environment with emphasis on water and air resources. Characteristics and uses of contemporary sensors, measurement and data acquisition systems. Methods of obtaining and processing computer compatible data records. Includes laboratory. Offered on demand. C-L: Botany 330L. 4 units. *Knoerr*

335. Water Quality Modeling. Development and evaluation of simulation models of surface water quality. Mechanistic descriptions of aquatic ecosystems and materials transport. Statistical methods for monitoring design and trend detection. Uncertainty analysis. Prerequisites: Environment 236 and 350. 2 units. *Reckhow*

340. Biohazard Science. Philosophy of safety; etiology, infectivity, and transmissibility of disease; immunity and resistance; occupational and nosocomial infections; aerobiology; biotechnology; disinfection and sterilization; biocontainment and facility design; and safety management. Prerequisite: general microbiology or consent of instructor. 3 units. *Tulis*

341L. Methods in Biohazard Science. Fundamentals of disinfection, sterilization, and biocidal materials methodology, inactivation kinetics and dosimetry; medical waste management; mutagenicity, pyrogenicity, and PCR testing; laminar flow cabinet certification; microbiologic surface and air sampling; respirator assessment; laboratory audits and regulatory compliance. Prerequisite: Environment 340 or consent of instructor. 4 units. *Staff*

342. Bioaerosols. Principles of aerobiology; sick-building syndrome and building-related illness; ventilation, filtration, and humidification systems; chemical and biologi-

cal pollutants; health effects; sampling and assessment of bioaerosols; remediation measures; handling indoor air quality perceptions. Consent of instructor required. 2 units. *Thomann and Tulis*

343. Hazard Management, Law, and Ethics. Economics and ecology; survey of federal and state laws; legal basis for regulation; enforcement, including inspections and audits, permits and licensing, and citations, injunctions, and penalties; management accountability; ethics in science and medicine; risk assessment and management; policy development and implementation. Consent of instructor required. 3 units. *Warren*

351. Computer-Based Map Analysis with Geographic Information Systems. Introduction to computer-based map analysis systems (geographic information systems). Use of map algebra in computer analyses of spatially distributed map information. Applications in analyzing and solving natural resource management problems. 3 units. *Staff*

352. Spatial Analysis in Ecology. Techniques of spatial analysis as applied to ecological data, including scaling techniques, pattern analysis, indices of patchiness (adjacency, contagion), and inferential methods (cross-correlation, permutation procedures). Emphasis on hands-on applications in computer lab. Prerequisite: Environment 214 or consent of instructor. 3 units. *Urban*

353. Advanced Topics in Landscape Ecology. Small groups of students working together to complete a project in landscape analysis integrating remote sensing, geographic information systems, spatial analysis, and simulation modeling. Expectation is that each student will have experience in at least one of these areas. Consent of instructor required. Offered on demand. 3 units. *Halpin and Urban*

355. Optimization Methods for Resource Management. Introductory survey of optimization techniques useful in resource management and environmental decision making. Numerical techniques for unconstrained optimization, linear programming, dynamic programming, and optimal control methods. Consent of instructor required. 3 units. *Staff*

356. Environmental Fluid Mechanics. Introduction to turbulent fluid flow and Navier Stokes equations; basic concepts in statistical fluid mechanics; development of prognostic equations for turbulent fluxes, variances, and turbulent kinetic energy; Monin and Obukhov similarity theory for stratified turbulent boundary layer flows; applications to CO₂, water vapor, and heat fluxes from uniform and nonuniform surfaces; the local structure of turbulence and Kolmogorov's theory; turbulent energy transfer and energy cascade between scales; turbulence measurements in the natural environment. Prerequisite: Civil Engineering 122L, Mathematics 111 or 135, or equivalent. 3 units. *Katul*

363. Economics of Natural Resource Damage Assessment. Topics vary each semester offered. C-L: Economics 363. 3 units. *Smith*

372. Advanced Theory of Environmental and Natural Resource Economics. The application of economic concepts to private- and public-sector decision making concerning natural and environmental resources. Topics include modeling externalities and public goods, design of policy instruments, management of renewable and nonrenewable resources, welfare theory and valuation methods, and environmental risk. Prerequisites: Economics 301 and 302 or consent of instructor. C-L: Economics 372. 3 units. *Mansfield and Smith*

373. Topics in Environmental and Natural Resource Economics. Examination of current research in environmental and natural resource economics, building on the theory of environmental and natural resource economics developed in Economics/En-

vironment 372. Includes selected topics from Economics/Environment 372 and other quantitative and theoretical issues pertinent to prevailing research in environmental economics. Prerequisite: Economics/Environment 372 or consent of instructor. C-L: Economics 373. 3 units. *Mansfield and Smith*

385. Environmental Decision Analysis. Bayesian decision theory, including probability, subjective probability, utility theory, value of sample information, and multiattribute problems. Applications of decision theory in resource and environmental policy-making. Prerequisite: Environment 251 or equivalent. 3 units. *Maguire and Reckhow*

388. Seminar in Resource and Environmental Policy. Discussion of the political, legal, and socioeconomic aspects of public and private action in environmental quality control and management. Consent of instructor required. Variable credit. *Staff*

389. Seminar in Conservation and Environmental History. Traces the evolution of conservation and environmental movements and the development of environmental ethics. History of agencies, industries, associations, and citizen groups as well as overall policies for land and resources. Comparison of parallel developments in Canada. Consent of instructor required. C-L: History 389. 3 units. *Steen*

394. Professional and Field Skills. A series of modules offered on a rotating basis over the four semesters of a professional master's program. Modules consist of one to twenty hours of instruction in a skill needed for professional development or competence in field sampling or laboratory techniques. Examples of topics include environmental negotiation; environmental safety; use of computer packages; preparing presentations and written reports; sampling design; field sampling of trees, herbaceous plants, streambottom organisms; toxicological testing using plankton. Variable credit. *Maguire*

398. Program Area Seminar. Required seminar in each program area. Students present master's project research. Pass/fail grading only. Variable credit. *Staff*

399. Master's Project. An applied study of a forestry or environmental management problem or a theoretical research effort. A seminar presentation of the objectives, methodology, and preliminary findings is required. A written (or other medium) report at the conclusion of the project is also required. Undertaken with the guidance of the student's adviser. Consent of instructor required. Pass/fail grading only. 4 to 6 units, to be arranged. Variable credit. *Staff*

Intensive Courses

258. Forest Appraisal. Presentation of the principles of real estate appraisal as they apply to valuation problems in forestry. Consideration of appraisal theory, accounting and tax concepts in forest land management. Application of financial analysis techniques to forest land management through lectures and problem-solving sessions. Intensive. Variable credit. *Burak*

259. Reporting the Results of Forestland Appraisals. Examination and critique of appraisal reports. Adherence to real property appraisal standards. Evaluation of reports emphasizing organization and concepts; the macro-side of reports. Consent of program director required. Intensive. 1 unit. *Burak*

265. Financial Management: The Key to Sound Resource Management. Examination of aspects of managerial accounting and financial analysis crucial to decision making in the management of natural resources. Topics include concepts of accounting and cost accounting, analysis of financial statements, planning and budgeting, management control, sources

and uses of funds, break-even analysis, measurement and projection of operating results, and analysis of capital investment decisions. Intensive. 1 unit. *MacKinnon*

281. Environmental Law. Examination of contemporary environmental law and its common law antecedents in the context of the American legal system. Objectives are to provide basic training in analyzing cases and statutes, applying knowledge in a classroom setting, and using a law library. Intensive. Offered on demand. 1 unit. *M. Heath*

286. Land Conservation Strategies. Knowledge, information, and identification of available resources to enable a volunteer or experienced professional to complete a land acquisition for conservation purposes. Consent of instructor required. Intensive. 1 unit. *Ludington*

311. Identification and Delineation of Jurisdictional Wetlands. Course combines both classroom lectures and field exercises covering soil chemistry, soil taxonomy, hydric soil indicators, Munsell color charts, hydrophytic plant communities, wetland hydrology, use and interpretation of the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual, and field measurements techniques. Primary emphasis on field identification and jurisdictional wetlands. Consent of Administrative Director of Continuing Education required. 1 unit. *Faulkner and Richardson*

318. New Advances in Ecological Risk Assessment. Overview of ecological risk assessment; demonstration of risk assessment of toxic chemicals to the ecological environment. Emphasis on aquatic environments through discussions and examples; case-study applications. Consent of instructor required. Intensive. 1 unit. *Di Giulio, Parkhurst, and Warren-Hicks*

333. Basic Groundwater Hydrology. Basic principles, concepts, and methods of groundwater hydrology. Topics include water storage and transmission characteristics of rocks, physical features of U.S. groundwater regions, problems related to development and protection of the groundwater resource. Intensive. 1 unit. *R. Heath*

386. Implementation of the National Environmental Policy Act on Federal Lands and Facilities. Overview of NEPA content, case law, and current issues. Discussion of methods of implementing regulations, conducting and processing an environmental impact analysis, determining the proper level of documentation to fully record and disclose results. Intensive. 1 unit. *Clark*

387. Preparing and Documenting Environmental Impact Analyses. Principles of how to acquire, assemble, analyze, and present in document form, information required by the National Environmental Policy Act. Extensive practical exercises designed to make use of realistic case study materials provided by students. Intensive. Consent of program director required. 1 unit. *Magness*

COURSES CURRENTLY UNSCHEDULED

210. Forest Pathology

210L. Forest Pathology

256S. Seminar in Ocean Sciences

267S. Conservation Biology of Marine Mammals

287. Environmental Planning and Land Development

306. Models for Landscape Forestry: Meeting Consumer Demands

393. Professional Writing

Non-ENV Courses Taught at the Marine Laboratory

Biology

10L. Marine Biology. Physical and chemical characteristics of marine ecosystems and the functional adaptations of marine organisms to these systems. Lectures, field trips, and laboratories. For students not majoring in a natural science. (Given at Beaufort.) C-L: Marine Sciences. One course. *Kenney*

113L. Behavioral Ecology. How ecological factors shape foraging, mating, aggressive, and social behavior. Laboratory experiments and field observations from the Outer Banks environment. Independent projects and seminars. (Given at Beaufort in the summer.) Prerequisite: Biology 25L. C-L: Marine Sciences. One and one-half courses. *Rubenstein (visiting summer faculty)*

114L. Biological Oceanography. Physical, chemical, and biological processes of the oceans, emphasizing special adaptations for life in the sea and factors controlling distribution and abundance of organisms. One course (spring); one and one-half courses (summer). (Given at Beaufort.) Prerequisite: Biology 25L. C-L: Marine Sciences. Variable credit. *Ramus or staff*

123. Analysis of Ocean Ecosystems. The history, utility, and heuristic value of the ecosystem; ocean systems in the context of Odum's ecosystem concept; structure and function of the earth's major ecosystems. (Given at Beaufort.) Prerequisite: one year of biology, one year of chemistry, or consent of instructor. C-L: Marine Sciences. One course. *Barber*

126. Marine Mammals. Ecology, social organization, behavior, acoustic communication, and management issues. Focused on marine mammals in the southeastern United States (for example, bottlenose dolphin, right whale, West Indian manatee). (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. 'One course. *Read or staff*

126L. Marine Mammals. Laboratory version of Biology 126. (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. One course. *Read or staff*

129L. Marine Ecology. Factors that influence the distribution, abundance, and diversity of marine organisms. Course structure integrates lectures, field excursions, and independent research projects. Topics include characteristics of marine habitats, adaptation to environment, species interactions, biogeography, larval recruitment, rocky shores, marine mammals, fouling communities, tidal flats, beaches, subtidal communities, and coral reefs. Not open to students who have taken Biology 203L. One course (fall and spring); one and one-half courses (summer). (Given at Beaufort.) Prerequisite: none; suggested—introductory ecology, invertebrate zoology, or marine botany. C-L: Marine Sciences. Variable credit. *Staff*

150L. Physiology of Marine Animals. Environmental factors, biological rhythms, and behavioral adaptations in the comparative physiology of marine animals. One course (fall); one and one-half courses (summer). (Given at Beaufort.) Prerequisites: Biology 25L and Chemistry 12L. C-L: Marine Sciences. Variable credit. *Forward*

155L. Biochemistry of Marine Animals. Functional, structural, and evolutionary relationships of biochemical processes of importance to marine organisms. One course (fall and spring); one and one-half courses (summer). (Given at Beaufort.) Prerequisites: Biology 25L; and Chemistry 11L, 12L. C-L: Marine Sciences. Variable credit. *Rittschof*

176L. Marine Invertebrate Zoology. Structure, function, and development of invertebrates collected from estuarine and marine habitats. Not open to students who have

taken Biology or Zoology 274L. One course (fall); one and one-half courses (summer). (Given at Beaufort.) Prerequisite: Biology 25L. C-L: Marine Sciences. Variable credit. *Kirby-Smith (environment)*

191, 192. Independent Study. For junior and senior majors with consent of director of undergraduate studies and supervising instructor. Three courses of 191, 192, 193T, and 194T, maximum. Variable credit. *Staff*

193T, 194T. Tutorial. For junior and senior majors with consent of director of undergraduate studies and supervising instructor. Three courses of 191, 192, 193T, and 194T, maximum. Variable credit. *Staff*

295S, 296S. Seminar. Variable credit. *Staff*

COURSES CURRENTLY UNSCHEDULED

169L. Marine Communities

Botany

295S, 296S. Seminar. Credit to be arranged. Variable credit. *Staff*

359, 360. Research in Botany. Individual investigation in the various fields of botany. Credit to be arranged. C-L: Marine Sciences. Variable credit. *All members of the graduate staff*

Cell Biology

210. Independent Study. Directed reading and study in cell biology/physiology. Descriptions of specific areas may be obtained from the director of graduate studies. Consent of director of graduate studies required. 3 to 9 units each. C-L: Marine Sciences. Variable credit. *Staff*

Environment

191, 192. Independent Study. Open to qualified juniors and seniors with consent of instructor and director of undergraduate studies. Variable credit. *Staff*

Geology

191, 192. Independent Study. Directed reading or research. Open only to qualified juniors and seniors by consent of director of undergraduate studies and supervising instructor. One course each or 3 units each. *Staff*

195. Independent Study for Nonmajors. Open to qualified juniors and seniors upon approval of the departmental faculty. One course or 3 units. *Staff*

202. Beach and Island Geological Processes. Processes affecting evolution of beaches and barrier islands with emphasis on the effect of constructions. Not open to students who have taken Geology 196. (Given at Beaufort on three weekends.) C-L: Marine Sciences. Half course or 2 units. *Pilkey*

371, 372. Advanced Topics in Geology. To meet the individual needs of graduate students for independent study in various environmental sedimentary fields. Variable credit. *Staff*

Zoology

353, 354. Research. To be carried on under the direction of the appropriate staff members. Hours and credit to be arranged. C-L: Marine Sciences. Variable credit. *Staff*

360, 361. Tutorials. An approved academic exercise, such as writing an essay or learning a research skill, carried out under the direction of the appropriate staff members. Hours and credit to be arranged. Variable credit. *Staff*

(U.S. 2013-2014)

Durham, NC 27706

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Duke University
1997-98

Nicholas School of the Environment
Marine Laboratory



The Mission of Duke University

The founding Indenture of Duke University directed the members of the university to "develop our resources, increase our wisdom, and promote human happiness."

To these ends, the mission of Duke University is to provide a superior liberal education to undergraduate students, attending not only to their intellectual growth but also to their development as adults committed to high ethical standards and full participation as leaders in their communities; to prepare future members of the learned professions for lives of skilled and ethical service by providing excellent graduate and professional education; to advance the frontiers of knowledge and contribute boldly to the international community of scholarship; to foster health and well-being through medical research and patient care; and to promote a sincere spirit of tolerance, a sense of the obligations and rewards of citizenship, and a commitment to learning, freedom, and truth.

By pursuing these objectives with vision and integrity, Duke University seeks to engage the mind, elevate the spirit, and stimulate the best effort of all who are associated with the university; to contribute in diverse ways to the local community, the state, the nation, and the world; and to attain and maintain a place of real leadership in all that we do.

bulletin of
Duke University
1997-98

Nicholas School of the Environment
Marine Laboratory

Nicholas School of the Environment

Marine Laboratory

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The information in this publication applies to the calendar year 1997 and is accurate and current, to the extent possible, as of September 1996. The university reserves the right to change programs of study, academic requirements, teaching staff, the calendar, and other matters described herein without prior notice, in accordance with established procedures.

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An essential feature of Duke University is its commitment to integrity and ethical conduct. Duke's honor system helps to build trust among students and faculty and to maintain an academic community in which a code of values is shared. Instilling a sense of honor, and of high principles that extend to all facets of life, is an inherent aspect of a liberal education.

As a student and citizen of the Duke University Community:

- I will not lie, cheat, or steal in my academic endeavors.
- I will forthrightly oppose each and every instance of academic dishonesty.
- I will communicate directly with any person or persons I believe to have been dishonest. Such communication may be oral or written. Written communication may be signed or anonymous.
- I will give prompt written notification to the appropriate faculty member and to the Dean of Trinity College or the Dean of the School of Engineering when I observe academic dishonesty in any course.
- I will let my conscience guide my decision about whether my written report will name the person or persons I believe to have committed a violation of this code.

I join the undergraduate student body of Duke University in a commitment to this Code of Honor.

Information that the university is required to make available under the Student Right to Know and Campus Security Acts may be obtained from the Office of University Relations at 684-2823 or in writing at 615 Chapel Drive, Duke University, Durham, NC 27708.

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University Administration

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Daniel Rittschof, Ph.D., *Associate Professor of Zoology and Director of Graduate Studies-Nicholas School of the Environment*
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Hugh C. Willis, *General Maintenance Mechanic Senior*

Duke/University of North Carolina Oceanographic Consortium Staff

Richard T. Barber, *Acting Director of the Duke/University of North Carolina Oceanographic Consortium*

Dwight B. Arrants, *Marine Technician, R/V Cape Hatteras*
Karen D. Ashley, *Staff Specialist*
Donny L. Baber, *Cook/Messman, R/V Cape Hatteras*
Jonathan Borden, *Marine Technician, R/V Cape Hatteras*
Mark O. Cook, *Marine Technician, R/V Cape Hatteras*
Robert A. Daniels, *A.B. Seaman, R/V Cape Hatteras*
Mitchell A. Dixon, *First Assistant Engineer, R/V Cape Hatteras*
Stephen E. Dixon, *A.B. Seaman, R/V Cape Hatteras*
Quentin M. Lewis, Jr., *Marine Superintendent*
Robert J. Lipscomb, *Steward/Cook, R/V Cape Hatteras*
Larry N. Morris, *Assistant Marine Superintendent/Second Mate, R/V Cape Hatteras*
Dale H. Murphy, *Chief Mate, R/V Cape Hatteras*
John L. Nelson, *Bosun, R/V Cape Hatteras*
Richard C. Ogus, *Master, R/V Cape Hatteras*
Mark E. Smith, *Engineer, R/V Cape Hatteras*
Joseph F. Ustach, *Executive Officer*

Marine Laboratory Calendar*

Summer 1997

May 19—First summer term begins

June 20—First summer term ends

July 21—Second summer term begins

August 22—Second summer term ends

1997

September

2 Fall term begins
15 Drop/Add ends

October

13-14 Fall break
29 Registration begins for spring semester, 1997

November

18 Registration ends for spring semester, 1997
19 Drop/Add begins
26 Thanksgiving recess (begins at 12:40 p.m. Wednesday)

December

1 Classes resume
20 Fall term ends

1998

January

15 Spring term begins
28 Drop/Add ends

March

16-20 Spring break

April

1-16 Registration for fall semester, 1997
17 Drop/Add begins

May

9 Spring term ends
18 First summer term begins

June

19 First summer term ends

July

20 Second summer term begins

August

21 Second summer term ends

*The dates in the calendar are tentative and subject to change.

General Information



The Nicholas School of the Environment

Duke University's Nicholas School of the Environment is unique among American universities, offering a distinctive combination of multidisciplinary graduate and professional degree programs, as well as opportunities for undergraduate study and continuing professional education. Inaugurated in 1991, the Nicholas School of the Environment builds on Duke's historically strong base in environmental science, economics and policy; the marine sciences; and forestry. It combines the Duke University Marine Laboratory and the former School of Forestry and Environmental Studies, both of which have established reputations for excellence dating from 1938.

Programs at the Nicholas School of the Environment Marine Laboratory are central to the school's mission to provide interdisciplinary educational and research opportunities addressing an area of vital concern—the quality of the Earth's environment and the sustainable use of its natural resources. Oceans dominate the Earth's surface and greatly affect daily life. Oceans regulate climate, play a critical role in the hydrologic cycle, sustain a large portion of the Earth's plant and animal species, supply food and mineral resources, and inspire the aesthetic nature of humankind. Ocean studies are central to the resolution of global environmental problems related to the impacts of humans on ecological systems, biodiversity, climate change, coastal land management, environmental quality, and environmental health.

The Marine Laboratory

The Marine Laboratory is a campus of Duke University and a unit within the Nicholas School of the Environment. Its mission is education and research in basic ocean processes, coastal environmental management, marine biotechnology and marine biomedicine.

During the 1930s, Dr. A. S. Pearse and colleagues from Duke University were attracted to Pivers Island and its surrounding abundance of marine life for their summer field studies. The island afforded an excellent location for a field station and through the subsequent efforts of Dr. Pearse and others, the land was acquired for the Duke University Marine Laboratory. By 1938 the first buildings were erected. Originally, the laboratory served only as a summer training and research facility.

Today, the Nicholas School of the Environment Marine Laboratory operates year-round to provide training and research opportunities to about 3,500 persons annually, including undergraduate, graduate and professional students enrolled in the university's academic programs; visiting student groups who use the laboratory's facilities; and scientists who come from North America and abroad to conduct research. A

seminar/lecture series features many distinguished scientific speakers from across the nation and abroad.

As an interdepartmental training and research facility of Duke University, the Marine Laboratory operates under the policies, procedures, and regulations of the university. The resident faculty are affiliated with specific departments and schools of the university and represent the disciplines of oceanography, marine biology, marine biomedicine, marine biotechnology, and coastal environmental management.

In addition, the Marine Laboratory is a member of the National Association of Marine Laboratories (NAML), a nonprofit organization of over 90 members providing a variety of academic, research, and public service programs. The laboratories are unique "windows on the sea," providing information on the rich environmental mosaic of coastal habitats where land meets sea. Their 'sense of place' encourages wise local land management and protection of our precious natural resources.

Location and Natural Environment

The Marine Laboratory is situated on Pivers Island within the Outer Banks of North Carolina, only 150 yards across the channel from the historic town of Beaufort. A bridge connects the island with US Highway 70, making the laboratory readily accessible by automobile. Other transportation to the laboratory consists of bus service to Morehead City, about two miles distant from Beaufort, and airline service to regional airports (New Bern, Kinston, and Jacksonville).

Beaufort is the third oldest town in the state and is surrounded by fishing and agricultural communities. The area is well known for its historic and scenic attractions as well as being a seaside resort. Cape Lookout National Seashore Park and the Rachel Carson Estuarine Research Reserve are within easy boating distance.

The area's system of barrier islands, sounds, and estuaries is rich in flora and fauna, and diverse habitats, including rivers, creeks, mud flats, sand beaches, dunes, marshes, peat bogs, cypress swamps, bird islands, and coastal forests, making the area an excellent haven for both nature lovers and those interested in the pursuit of marine science.

The laboratory is within range of both the temperate and tropical species of biota. The edge of the Gulf Stream oscillates between 30 and 40 miles offshore, with reefs on the wide continental shelf. A great variety of phytoplankton, seaweeds, seagrasses, and marshgrasses may be found in the area. Common animals include the blue crab, squid, shrimps, snails, clams, ctenophores, jellyfish, hydroids, sponges, polychaetes, sea urchins, starfish, brittle stars, sand dollars, skimmers, terns, gulls, herons, sea turtles, porpoises, and many species of fish. All provide ample opportunity for study and research and are readily accessible on foot, by car, or by boat.

The Beaufort-Morehead City area provides location for five other laboratories that collectively house one of the higher concentrations of marine scientists in the nation. These are the University of North Carolina's Institute of Marine Sciences, the North Carolina State University Seafood Laboratory, the North Carolina Aquarium at Bogue Banks, North Carolina Division of Marine Fisheries; and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service, Beaufort Laboratory. This concentration of marine scientists provides a critical mass for the pursuit of science and education.

The Beaufort Experience

The Nicholas School of the Environment Marine Laboratory is an academic community, and the self-sufficient nature of its residential life serves well those who wish to study or to conduct research. The academic programs are limited to eighty students per regular academic semester (spring or fall) and one hundred per summer term, offering

an unparalleled small-group learning experience. Although recreational opportunities are ample, the distractions are limited, allowing both student and researcher to become totally involved in the pursuit of marine science. Both students and researchers alike find that the Marine Laboratory has an invitingly open, friendly, and relaxed atmosphere that draws many back year after year. This community feeling, the potential for total immersion in learning, and the beauty of the natural environment have contributed to what has been called "The Beaufort Experience."

Teaching and Research Facilities

The Marine Laboratory's modern physical plant consists of 23 buildings, including four dormitories, a large dining hall, one residence, a boathouse that has been remodeled as a student commons, a storehouse for ship's gear, classroom laboratories, six research buildings, and a maintenance complex. The Marine Laboratory operates the R/V *Susan Hudson*, a 57-foot fully-equipped coastal oceans research vessel, and is the home port for the R/V *Cape Hatteras*, a 135-foot oceanographic research vessel operated by the Duke/University of North Carolina Oceanographic Consortium.

The laboratory also maintains darkrooms, a well-equipped workshop, a stockroom, and a purchasing department.

Research Laboratories. Each research laboratory building is air-conditioned and equipped with running seawater through a PVC system. There are tanks, water tables, aquaria, autoclaves, ovens, and outdoor continuous-flow growth facilities. In addition to commonly used laboratory equipment, the following are available: refrigerated centrifuges, fluorometers, spectrophotometers, balances, pH meters, hoods, liquid scintillation counter, constant temperature equipment, and HPLC. A complete sedimentological research laboratory is equipped for state-of-the-art chemical and particle size analyses.

Computing Facilities. The Nicholas School of the Environment Marine Laboratory houses two Sun Sparc stations as well as two Duke University public access clusters, MAC and IBM-PC, all connected to the Internet. Available for use are eleven 586-based workstations and five Power PCs with word processing and statistics programs.

The laboratory operates an AT-compatible computer for processing and analysis of static and moving images. Static images captured with a video camera and Targa-M8 frame grabber board can be analyzed by means of the JAVA software (Jandel Scientific). Graphic and printed output of results is possible using an HP 7475A plotter or an HP LaserJet printer. Moving images are recorded on video tape and analyzed using the Motion Analysis System (Celltrack Motion Analysis Expertvision System, Motion Analysis Corp.). A video processor in an IBM/AT-compatible computer tracks objects and calculates direction of movement, velocity, and rate of change of direction. Statistical and graphics programs allow final processing of these data.

Color printing and scanning services are also available on the island.

I. E. Gray Library-Auditorium. Located in the building are the 1,917-square-foot auditorium with stage, a library, the librarian's office, one seminar room, and general-use computer clusters. The auditorium has a seating capacity of approximately 200 and is suitable for lectures, seminars, symposia, and small regional or national meetings. Inquiries concerning use of auditorium or seminar room space should be addressed to Personnel and Auxiliaries, Nicholas School of the Environment Marine Laboratory, 135 Duke Marine Lab Road, Beaufort, NC 28516-9721.

Library Facilities. The Pearse Memorial Library is a branch library of the Duke library system. It holds approximately 23,000 volumes with a concentration in the marine sciences. The library currently subscribes to 60 scientific journals and a few CD ROMs. Support services include a general access copier, interlibrary loan within the Duke-UNC-NCSU library systems, and on-line literature search capabilities.

Cooperative agreements for interlibrary loan and document delivery service have also been established with the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA/NMFS) and University of North Carolina Institute of Marine Sciences (UNC/IMS), and University of North Carolina at Wilmington.

Natural History Resource Center. The Natural History Resource Center (NHRC) preserves and disseminates knowledge concerning ecological systems and the distribution and abundance of marine plants and animals. The center consists of an extensive reference collection of marine organisms (the museum), a library of taxonomic references and ecological publications, a large outdoor seawater facility, and a research laboratory designed to facilitate the collection, preservation and identification of marine organisms. The center provides students, researchers and lay persons with advice on the natural history of North Carolina's marine ecosystems. Dr. William Kirby-Smith is the director.

Research Vessels. The R/V *Susan Hudson* is USCG certified to carry passengers for hire to 100 miles. This 57-foot, welded aluminum vessel is powered by twin diesels to a speed of 16 knots. It is fully equipped for light-duty oceanographic research, including an SBE 25 CTD with PAR meter, fluorometer and transmissometer. Funding from the National Science Foundation and the Office of Naval Research has provided for many research instruments that are available to visiting investigators. A marine technician is available to facilitate cruises. Inquiries concerning use of the research vessel should be directed to Karen D. Ashley (919) 504-7583 or e-mail to karena@duncoc.ml.duke.edu.

Marine Laboratory students and researchers also have access to the R/V *Cape Hatteras*, operated by the Duke/University of North Carolina Oceanographic Consortium.

MARINE/FRESHWATER BIOMEDICAL CENTER

The Marine/Freshwater Biomedical Sciences Center of Duke University is a problem-oriented center that is nationally and internationally recognized for its contributions to environmental health. It integrates unique facilities and faculty expertise available on the Beaufort and Durham campuses of Duke University and applies this powerful collective strength to challenging problems of human and environmental health significance, with a focus on the adverse effects associated with the toxicity of metals and free radicals. Research advances by center investigators increase the understanding of underlying toxic mechanisms, so that good human and environmental health choices can be made.

The center is distinguished by its record in biotechnology, its interdisciplinary programs, and its effectiveness in advancing marine and freshwater model systems for mechanistic studies. It is unique in its intellectual setting, providing a bridge between Duke's nationally recognized School of Medicine, Nicholas School of the Environment and Marine Laboratory. In its physical setting it draws effectively on the institutes and industries of the Research Triangle of North Carolina. Through its interactive workshops and outreach efforts, the center communicates research findings on marine and freshwater aspects of environmental health problems to the clinical and research arms of the medical community, policy makers and the public at large.

The specific aims of the center are to:

- Enhance the unique strengths of environmental health research programs of center investigators, drawing expertise from the university and from the region
- Provide a cohesive framework for interdisciplinary interactions, information exchange, and innovative technology development focused on metal and free-radical toxicity
- Aid in the development and use of marine and freshwater model systems for mechanistic studies of human and environmental health relevance
- Enhance the application of existing high-tech facilities and methodologies to both individual and collective environmental health research programs

- Provide community outreach and education that informs scientists, policy makers and the public at large about environmental health issues and research advances

Feasibility studies are conducted to explore the advantages of various experimental approaches and to encourage innovative research.

Students interested in working with members of the center's participating faculty should direct their first inquiry to the Admissions Office, Nicholas School of the Environment Marine Laboratory, 135 Duke Marine Lab Road, Beaufort, North Carolina 28516-9721; telephone (919) 504-7502. It should be noted, however, that the center does not grant degrees. Graduate students are enrolled in the degree program of the respective department or school of their mentor.

Researchers may direct their inquiries to the office of the Marine/Freshwater Biomedical Center, telephone (919) 504-7508. Dr. Celia Bonaventura serves as center director.

DUKE/UNIVERSITY OF NORTH CAROLINA OCEANOGRAPHIC CONSORTIUM

The Duke/University of North Carolina Oceanographic Consortium operates a 135-foot oceanographic research vessel, the R/V *Cape Hatteras*. The ship operates both on the continental shelf and in the deep sea in the western North Atlantic, concentrating in the region between Nova Scotia and the Caribbean. The ship is a member of the academic research fleet supported by the National Science Foundation for the purpose of providing oceanographic research opportunities to investigators.

R/V *Cape Hatteras* is used for training at sea by the universities that make up the Oceanographic Consortium (Duke, North Carolina State, UNC-Chapel Hill, UNC-Wilmington, UNC-Greensboro, and East Carolina). The consortium also manages the acquisition and maintenance of oceanographic instrumentation used aboard R/V *Cape Hatteras*, and holds annual meetings of ocean science staff from member institutions at the Duke University Marine Laboratory. Inquiries concerning use of the research vessel should be directed to Quentin M. Lewis, Jr. (919) 504-7580 or e-mail to quentinl@duncoc.ml.duke.edu.

MARINE SCIENCES EDUCATION CONSORTIUM

The Marine Sciences Education Consortium (MSEC) was developed to provide a formal curriculum in the marine sciences, including supervised research, to member institutions. Such institutions are liberal arts colleges or universities attended by students who are preparing for careers in the marine sciences or who have a strong liberal arts interest in the oceans but for whom no specialized programs in the marine sciences are available. MSEC students have access to the spring and fall semester programs in marine sciences as well as the summer program at the Duke Marine Laboratory. The room and board plan is available to MSEC students.

Currently, member institutions include Allegheny College, Denison University, the Five Colleges Coastal and Marine Sciences Program (Amherst College, Hampshire College, Mount Holyoke College, Smith College, and the University of Massachusetts), Furman University, Gettysburg College, Hampden-Sydney College, Hood College, Juniata College, Macalester College, Miami University, North Carolina State University, University of Notre Dame, Oberlin College, Presbyterian College, University of Richmond, Trinity College, Washington and Lee University, Wittenberg University, and the College of Wooster.

Members join upon invitation and mutual agreement. Inquiries from interested institutions are welcome and requests to join the MSEC will be considered. Such inquiries should be addressed to the Director, Nicholas School of the Environment Marine Laboratory, 135 Duke Marine Lab Road, Beaufort, North Carolina 28516-9721.

The Faculty



The Faculty and Their Programs

Richard T. Barber, Ph.D., *Harvey W. Smith Professor of Biological Oceanography–Nicholas School of the Environment*; B.S., Zoology and Botany, Utah State University; Ph.D., Biological Science, Stanford University.

Dr. Barber's research in carbon cycling by ocean processes has implications for climate regulation. At Duke he investigates the interrelationship of large-scale thermal dynamics and ocean basin productivity, emphasizing (1) how biological and physical processes contribute to the exchange of carbon dioxide between the ocean and the atmosphere and (2) how the "biological pump" transfers carbon into the deep sea. With current field work being carried out on cruises in the equatorial Pacific and in the Arabian Sea, his research group is focusing on the role of physical conditions in regulating primary production and phytoplankton performance. He is also investigating the role of a single micronutrient, iron, in the regulation of primary production in Antarctic waters as well as the equatorial Pacific, where a high nutrient/low chlorophyll character persists despite physical and chemical conditions which otherwise favor high productivity.

Barber, R.T., J.W. Murray, Jr., and J.J. McCarthy. 1994. Biogeochemical interactions in the equatorial Pacific. *Ambio* 23:62-66.

Barber, R., R. Ohrel, P. Fowler, and G. Gilbert. 1994. Why we are convinced that traditional strategies for wastewater management are not working. In *Integrated Coastal Wastewater Management in North Carolina*, R. Ohrel (ed.), pp. 7-13. Swansboro: North Carolina Coastal Federation.

Barber, R.T., M.P. Sanderson, S.T. Lindley, F. Chai, J. Newton, C.C. Trees, D.G. Foley, and F.P. Chavez. Primary productivity and its regulation in the equatorial Pacific during and following the 1991-92 El Niño. *Deep-Sea Research II* (In press.)

Celia Bonaventura, Ph.D., *Professor of Cell Biology–Nicholas School of the Environment*; B.A., Zoology, San Diego State University; Ph.D., Biochemistry, University of Texas, Austin.

Most of Dr. Celia Bonaventura's research is in the area of structure/function relationships of oxygen and electron-transport proteins. This continues to be her primary area of research, with an increasing focus on environmental perturbations of structure and function. Her research makes use of structural assays and complementary measurements of rapid reaction kinetics and equilibria, using UV/VIS and fluorescence spectroscopy and spectroelectrochemistry. Through comparison of human proteins with proteins of species inhabiting diverse environments, studies by Dr. Bonaventura and collaborators have increased our understanding of structural mechanisms that allow respiratory proteins to satisfy widely different physiological and environmental demands. Her current research concerns aspects of environmental toxicity associated with free radical interactions with respiratory proteins and structural alterations of respiratory proteins that are indicative of exposure to xenobiotics.

Bonaventura, C., J. Bonaventura, R. Stevens, and D. Millington. 1994. Acrylamide in polyacrylamide gels can modify proteins during electrophoresis. *Anal. Biochem.* 222:44-48.

Bonaventura, C., M. Arumugam, R. Cashion, J. Bonaventura, and W. F. Moo-Penn. 1994. Chloride masks effects of opposing positive charges in Hb A and Hb Hindsdale (β 139 Asn→Lys) that can modulate cooperativity as well as oxygen affinity. *J. Mol. Biol.* 239:561-568.

Mylvaganam, S.E., C. Bonaventura, J. Bonaventura, and E.D. Getzoff. 1996. Structural basis for the Root effect in haemoglobin. *Nature Structural Biol.* 3(3):275-283.

Joseph Bonaventura, Ph.D., *Professor of Cell Biology–Nicholas School of the Environment*; B.A., Zoology, San Diego State University; Ph.D., Biochemistry, University of Texas, Austin.

Dr. Joseph Bonaventura's research involves marine organisms found in diverse environments. Biochemical studies on the structural and functional diversity of these organisms has been shown to be paralleled by diversity at the molecular level. Red cells and respiratory proteins of marine organisms are being studied in order to increase the understanding of molecular adaptations and the mechanisms that give rise to functional flexibility. The kinetics and equilibria of ligand binding to hemoglobins, hemocyanins, and cytochrome c oxidase are studied with emphasis on the reactivity of these proteins as regulated by metabolic effectors. These studies are complemented by work in the biomedical sciences. Some of his work is carried out in the Protein Engineering and Technology Laboratory where properties of chemically modified, crosslinked, and immobilized forms of biologically active molecules are characterized. Recent research concerns the development of a synthetic blood substitute for humans. The project involves a detailed study of structure-function relationships in the human hemoglobin molecule and includes site-directed mutagenesis of hemoglobin genes. A new focus concerns the biochemistry of nitric acid in the human body and the development of a hypothesis of how this simple molecule might act as a regulator of the biosphere.

Robertson, J.D., J. Bonaventura, and A. Kohm. 1995. Nitric oxide synthase inhibition blocks octopus touch learning without producing sensory or motor dysfunction. *Proc. R. Soc. Lond. B* 261:167-172.

Weinberg, J.B., E. Doty, J. Bonaventura, and A.F. Haney. 1995. Nitric oxide inhibition of human sperm motility. *Fertility and Sterility* 64(2): 408-413.

Jia, L., C. Bonaventura, J. Bonaventura, and J. S. Stamler. 1996. S-Nitrosohaemoglobin: A dynamic activity of blood involved in vascular control. *Nature* 380:221-226.

Larry B. Crowder, Ph.D., *Professor of Marine Ecology—Nicholas School of the Environment*; B.A., Biology and Mathematics, California State University-Fresno; M.S., Ph.D., Zoology, Michigan State University.

Dr. Crowder's research centers on predation and food web interactions, mechanisms controlling recruitment variation in fishes, and on population modeling in conservation biology. He has studied food web processes in estuaries and lakes, and has used observational, experimental and modeling approaches to understand these interactions in an effort to improve fisheries management. He is a member of the Program Management Committee for SABRE (South Atlantic Bight Recruitment Experiment), a NOAA-funded project that focuses on identifying the unique characteristics of survivors of a cohort of fishes and links those characteristics to physical or biological variability. He has also been involved in population modeling and data analysis to address various management scenarios for threatened and endangered species. He and his students have developed life-history population models to address various management problems including exotic species introductions, acidification, habitat modification, bycatch and harvest for both freshwater and marine fishes.

Crowder, L.B., S.R. Hopkins-Murphy, and A. Royle. 1995. Estimated effect of Turtle-Excluder Devices (TEDs) on loggerhead sea turtle strandings with implications for conservation. *Copeia* 1995:773-779.

Crowder, L.B., D. Reagan, and D.W. Freckman. 1996. Food-web dynamics and applied problems. In *Food Webs: Integration of Patterns and Dynamics*, G.A. Polis and K.O. Winemiller (eds.), pp. 327-336. New York: Chapman & Hall.

Marshall, E.A. and L.B. Crowder. 1996. Assessing population responses to multiple anthropogenic effects: A case study with brook trout. *Ecol. Appl.* 6:152-167.

Richard B. Forward, Ph.D., *Professor of Zoology—Nicholas School of the Environment*; B.S., Biology, Stanford University; Ph.D., Biology, University of California, Santa Barbara.

Dr. Forward and his students investigate the behavior and physiology of estuarine and coastal zooplankton. This includes the photobehavior, photophysiology, biological rhythms, diurnal vertical migration, and horizontal migration of crustacean and fish larvae. Laboratory studies determined the effects of temperature, salinity, and feeding on phototaxis and geotaxis, salinity perception, and polarized light perception. Field studies have looked at horizontal and vertical distributions as related to environmental factors. Additional studies considered the cues for metamorphosis of crustaceans.

De Vries, M.C., R.B. Forward, Jr., and W.F. Hettler. 1995. Behavioral response of larval Atlantic menhaden to different rates of temperature change. *J. Fish. Biol.* 47:1081-1095.

McKelvey, L.M. and R.B. Forward, Jr. 1995. Activation of brine shrimp photoresponses involved in diel vertical migration by chemical cues from visual and non-visual predators. *J. Plankton Res.* 17:2191-2200.

Forward, R.B. Jr., M.C. De Vries, D. Rittschof, D.A.Z. Frankel, J.P. Bischoff, C.M. Fisher, and J.M. Welch. 1996. Effects of environmental cues on metamorphosis of the blue crab *Callinectes sapidus*. *Mar. Ecol. Prog. Ser.* 131:165-177.

Peter A. Howd, Ph.D., *Assistant Professor—Nicholas School of the Environment*; B.A., Geology and Economics, Williams College; M.S., Ph.D., Oceanography, Oregon State University.

Dr. Howd and his students study how waves and currents interact with each other, and with the existing morphology, to determine the physical evolution of the coastal zone. Research is currently being conducted in the description of low frequency (infragravity) waves in the surf zone, the temporal and spatial scales of beach profile variability, the processes and geological signature of sediment exchange between the beach and inner continental shelf, and the role of physical processes in modifying the geology and ecology of fringing reef environments. These diverse projects are unified by the goal of understanding the complex interactions between physical and geological

processes in the shallow coastal environments, and how those interactions determine the evolution of coastal geomorphology at time scales ranging from hours to decades and spatial scales from centimeters to kilometers.

Howd, P.A., A.J. Bowen, and R.A. Holman. 1992. Edge waves in the presence of strong longshore currents. *J. Geophys. Res.* 97:11357-11371.

Bryan, K., P.A. Howd, and A.J. Bowen. 1996. Field observations of bar-trapped edge waves. *J. Geophys. Res.* (Submitted.)

Howd, P.A. and M.O. Cox. 1996. Geological control of nearshore processes, Wimple Shoals, NC. *Mar. Geol.* (Submitted.)

William W. Kirby-Smith, Ph.D., *Associate Professor in the Practice of Marine Ecology—Nicholas School of the Environment*; B.S., Biology, University of the South; Ph.D., Zoology, Duke University.

Dr. Kirby-Smith's research interests involve marine ecology and invertebrate zoology. His recent research projects include the following: (1) ecology of rock outcrop communities on the continental shelf; (2) effects of salt marsh modifications on plant, invertebrate, fish and bird communities; (3) influence of pine plantation drainage on water quality and benthic invertebrates in receiving estuarine headwaters; (4) effects of agricultural development upon hydrology, water quality and biology in estuarine headwaters; and (5) the fate of fecal coliform bacteria in storm water runoff and estuarine headwaters. Additional research interests include the physiology of suspension feeding and its ecological consequences in estuaries.

Ustach, J. F., W. W. Kirby-Smith, and R.T. Barber. 1986. Effects of watershed modification on a small coastal plain estuary. In *Estuarine Variability*, D. Wolfe (ed.), pp. 177-192. New York: Academic Press.

Kirby-Smith, W. W., R. B. Forward, Jr., and S. Thompson. 1989. Use of grass shrimp (*Palaemonetes pugio*) larvae in field bioassays of the effects of agricultural runoff into estuaries. In *Pesticides in Terrestrial and Aquatic Environments*, D. L. Weigmann (ed.), pp. 29-36. Proc. Nat. Res. Conf., May 11-12, 1989. Blacksburg: Virginia Water Resources Research Center.

Kirby-Smith, W., S. J. Eisenreich, J. T. Howe, and R. A. Luettich, Jr. 1993. The effects in estuaries of pesticide runoff from adjacent farmlands. Report. U.S. Environmental Protection Agency. CR813415:205pp.

M. Susan Lozier, Ph.D., *Assistant Professor—School of the Environment*; B.S., Chemical Engineering, Purdue University; M.S., Chemical Engineering, Ph.D., Physical Oceanography, University of Washington. [Resident on the Durham campus.]

Dr. Lozier's research interests lie in the general area of mesoscale and large scale ocean dynamics. Specifically, she is interested in the Lagrangian aspects of ocean circulation, cross-frontal exchange processes and climate dynamics. Her approach to the study of these topics ranges from the application of numerical models to the analysis of observational data, with the focus on the testing and development of theory.

Currently, Dr. Lozier is studying the decadal variability of the North Atlantic Ocean, using historical hydrographic data from the period 1904 to 1990. A major objective of this work is to identify climatic anomalies during the past century and to determine the dynamics that govern their propagation. The Mediterranean outflow and the Labrador Sea are areas of particular interest. Current work is also focused on how local instabilities convolute a shelfbreak front and lead to mixing of shelf and slope waters.

Lozier, M. S., M. S. McCartney, and W. B. Owens. 1994. Anomalous anomalies in averaged hydrographic data. *J. Phys. Oceanogr.* 24:2624-2638.

Lozier, M. S., W. B. Owens, and R. G. Curry. 1995. The climatology of the North Atlantic. *Progress in Oceanogr.* 36:1-44.

Lozier, M. S., T. J. Bold, and A. S. Bower. 1996. The influence of propagating waves on cross-stream excursions. *J. Phys. Oceanogr.* (In press.)

David R. McClay, Jr., Ph.D., Professor of Zoology, Neurobiology, and Immunology; B.S., Zoology, Pennsylvania State University; M.S., Zoology, University of Vermont; Ph.D., Zoology, University of North Carolina, Chapel Hill. [Resident on the Durham campus.]

Dr. McClay studies (1) sea urchin development and (2) adhesion in tissue culture cells and in vertebrate embryos. Gastrulation movements and pattern formation have been the focus of the sea urchin work. A number of epigenetic events and adhesive changes have been described by his lab. He has identified a number of extracellular matrix and membrane molecules involved in adhesions and signal transductions. For example, the matrix molecule hyalin has been found to serve both as an adhesive substrate and as an epigenetic signal necessary for gastrulation to ensue. Integrin and cadherin adhesion molecules have been cloned and characterized. Also several signaling molecules have been cloned. The goal is to learn how cell-cell interactions continue to specify and mold the morphogenetic changes that occur all through gastrulation. In a separate project he is studying the sequence of events that bring molecules to the surface of the cell immediately following fertilization. A number of vesicles have been identified and these have been studied with imaging, immunochemistry, and pharmacology to determine how the timing of exocytosis is tightly regulated.

Armstrong, N., J. Hardin, and D. R. McClay. 1993. Ectodermal-mesenchymal interactions are involved in embryonic sea urchin skeletal pattern formation. *Development* 119:833-840.

Armstrong, N., and D. R. McClay. 1994. Cell autonomous behavior of mesenchyme cells in pattern formation in the sea urchin embryo. *Dev. Biol.* 162:329-338.

McCain, E. R., and D. R. McClay. 1994. Establishment of bilateral asymmetry in the sea urchin *Lytechinus variegatus*. *Development* 120:395-404.

Patricia D. McClellan-Green, Ph.D., Assistant Research Professor—Nicholas School of the Environment; B.S., M.S., Biology, East Carolina University; Ph.D., Toxicology, North Carolina State University.

Dr. McClellan-Green studies gene regulation and expression by aquatic organisms in response to xenobiotic exposure. Research is under way to determine the mechanism of PAH and PCB mediated gene regulation in fish. Other areas of interest include the identification and characterization of various cytochrome P-450s in aquatic organisms and the genetic regulation of select P-460 genes.

McClellan-Green, P. D., T. Collier, M. Myers, D. J. Brown, and G. C. Clark. Differential binding of 2,3,7,8 Tetrachlorodibenzo-p-dioxin and antibody recognition of the Ah-receptor in two benthic fish, the English sole (*Pleuronectes vetulus*) and the starry flounder (*Platichthys stellus*). *Arch. Biochem. Biophys.* (In press.)

Van Beneden, R. J., P. D. McClellan-Green, K. D. Ashley, and H. S. Gardner. Molecular analysis of medaka tumors: new models for carcinogenicity testing. In Proc. Fourth Ann. U.S. Army Biomedical Research and Development Laboratory Workshop. (In press.)

Michael K. Orbach, Ph.D., Professor in the Practice of Marine Affairs and Policy—Nicholas School of the Environment; B.A., Economics, University of California, Irvine; M.A., Ph.D., Cultural Anthropology, University of California, San Diego.

Dr. Orbach's research interests are in the application of social and policy sciences to coastal and ocean policy and management. His work uses a cultural, or human, ecology perspective to analyze human behavior in coastal and ocean environments. His current research projects include (1) the development and application of limited entry and effort management systems to marine fisheries; (2) the formation and socioeconomic impact of marine minerals policy; (3) marine mammal and endangered species-fisheries conflicts; and (4) citizen involvement in coastal and ocean policy. Dr. Orbach specializes in the application of science to the policy and management process.

Cicin-Sain, B., M. Orbach, et al. 1986. Conflictual interdependence: U.S.-Mexico relations on fishery resources. *Natural Res. J.* 26(4):769-792.

Orbach, M., and B. Queen. 1990. Ocean policy initiatives in coastal states: North Carolina's experience. *Coastal Management* 18:267-281.

Johnson, J., and M. Orbach. 1991. The impact of urbanization on Florida's spiny lobster fishery. *City and Society* 2(1):95-112.

C. Barry Osmond, Ph.D., *Adjunct Research Professor—Nicholas School of the Environment*; B.S., M.S., Botany, University of New England, Australia; Ph.D., Botany, University of Adelaide, Australia.

Collaborations continue between Dr. J. Ramus, Duke University Marine Laboratory, and Dr. Osmond in studies of photoinhibition of photosynthesis in marine macrophytes. These plants display interactions between rapidly reversible processes of photon protection (disposal of excess light as heat in the antennae of photosystems) and slowly reversible processes of photodamage (damage to and repair of the reaction center of photosystem II) which are more readily studied in-vivo than in land plants. The common marine macrophyte *Ulva rotundata* has become a model plant for these studies.

Osmond, C. B., J. Ramus, G. Levavasseur, L. A. Franklin, and W. J. Henley. 1993. Fluorescence quenching during photosynthesis and photoinhibition of *Ulva rotundata*. *Planta* 190:97-106.

Osmond, C. B. 1994. What is photoinhibition? Some insights from comparisons of shade and sun plants. In *Photoinhibition*, N. R. Baker and J. R. Bowyer (eds.). Bios. Scientific Publ. (In press.)

Joseph S. Ramus, Ph.D., *Professor of Biological Oceanography—Nicholas School of the Environment*; A.B., Ph.D., Botany, University of California, Berkeley.

Dr. Ramus's research includes the study of physical forcing of primary productivity in coastal plains estuaries. The research seeks a match between physiological response and the temporal frequency of physical drivers, the phasing of the organism with its environment.

Another of Dr. Ramus's interests involves biotechnological research which includes extracellular polysaccharides produced by marine microphotoautotrophs. Two aspects are under investigation: (1) environmental regulation of carbon partitioning; i.e., the diversion of newly fixed carbon from growth (new photosynthetic machinery) to disposable heteropolysaccharides (viscoelastic biopolymers), and (2) drag reducing properties of the biopolymers in pipe flow.

A third area under investigation is photoacclimation and photoinhibition in seaweeds and seagrasses. Of specific interest are macromolecular changes in the photosynthetic apparatus, the dynamic range of change and the effect of change on growth rate.

Ramus, J. 1992. Productivity of seaweeds. In *Primary Productivity and Biochemical Cycles in the Sea*, P. Falkowski and A. D. Woodhead (eds.), pp. 239-255. New York: Plenum Press.

Litaker, W., C. S. Duke, B. E. Kenney, and J. Ramus. 1993. Short-term environmental variability and phytoplankton abundance in a shallow tidal estuary. II. Spring and fall. *Mar. Ecol. Prog. Ser.* 94:141-154.

Osmond, B., J. Ramus, G. Levavasseur, L.A. Franklin, and W.S. Henley. 1993. Fluorescence quenching during photosynthesis and photoinhibition of *Ulva rotundata*. *Planta* 190:97-106.

Andrew J. Read, Ph.D., *Mary Derrickson McCurdy Fellow and Assistant Professor in the Practice of Marine Mammalogy—Nicholas School of the Environment*; B.S., M.S., Ph.D., Zoology, University of Guelph.

Dr. Read studies the life history and conservation biology of dolphins, porpoises and other marine mammals. He conducts life history research through longitudinal studies of individuals in coastal populations and cross-sectional studies of samples from strandings or incidental catches in commercial fisheries. In these studies, he focuses

attention on how animals partition energy among the competing demands of growth, maintenance and reproduction.

He also examines the impacts of human activities on populations of marine mammals and attempts to find solutions to such conflicts. In particular, he studies the effects of removals from populations caused by incidental mortality in commercial fisheries. This work is multifaceted and involves examination of animal behavior around nets, modification of fishing gear to minimize mortality, and demographic analyses of the effects of incidental catches.

Read, A. J., S. D. Kraus, K. D. Bisack, and D. Palka. 1993. Harbour porpoises and gill nets in the Gulf of Maine. *Conservation Biology* 7:189-193.

Read, A. J., R. S. Wells, A. A. Hohn and M. D. Scott. 1993. Patterns of growth in wild bottlenose dolphins, *Tursiops truncatus*. *J. Zool. (Lond.)* 231:107-123.

Read, A. J. and A. A. Hohn. 1995. Life in the fast lane: the life history of harbor porpoises from the Gulf of Maine. *Mar. Mammal Sci.* 11:423-440.

Daniel Rittschof, Ph.D., Associate Professor of Zoology—Nicholas School of the Environment; B.S., Ph.D., Zoology, University of Michigan.

Dr. Rittschof's research interests involve chemical communication systems. His studies include external and internal molecular mediation of behavior (chemical ecology). At present, test systems are marine and include crustaceans (true crabs, hermit crabs and barnacles), molluscs and fish. Studies span the gamut from practical (nontoxic antifouling coatings, fish foods and fish feeding stimulants) to purely basic (larval release pheromones, designer peptides with biological activity, hermit crab shell attractant cues, hormonal control of feeding behavior, and enzymatic activities in crustacean and gastropod saliva). The driving theme of the work is the evolution of chemical communication systems and their components.

Duval, M. A., A. M. Calzetta, and D. Rittschof. 1994. Behavioral responses of *Littorina irrorata* (Say) to water-borne odors. *J. Chem. Ecol.* 20(12):3321-3334.

Reinsel, K., and D. Rittschof. Environmental regulation of foraging in the sand fiddler crab *Uca pugilator* (Bosc 1802). *J. exp. Mar. Biol. Ecol.* (In press.)

Rittschof, D., J. Sarrica, and D. Rubenstein. Investigative, withdrawal, and alarm responses of *Clibanarius vittatus* as correlated with shell size and microhabitats. *J. exp. Mar. Biol. Ecol.* (In press.)

Research Staff and Their Programs

Bruce E. Kenney, Ph.D., Research Associate—Nicholas School of the Environment; B.S., Biology, Bates College; M.S., Botany, University of Wisconsin; Ph.D., Botany, Duke University.

Physiological ecology of photosynthesis by marine algae, specifically the influence of environmental conditions on photosynthetic production, is Dr. Kenney's primary area of interest. Understanding time scales of environmental variability is essential in determining the influence of such variations on photosynthetic performance. The practical aspects of fish nutrition and diet based on physiological principles is an important secondary interest.

Kenney, B. E., W. Litaker, C. S. Duke, and J. Ramus. 1988. Community oxygen metabolism in a shallow tidal estuary. *Estuarine Coastal Shelf Sci.* 27:33-43.

Ramus, J., B. E. Kenney, and E. J. Shaughnessy. 1989. Drag reducing properties of microalgal exopolymers. *Biotechnol. Bioeng.* 33:550-557.

Litaker, W., C. S. Duke, B. E. Kenney, and J. Ramus. 1993. Short-term environmental variability and phytoplankton abundance in a shallow tidal estuary. II. Spring and fall. *Mar. Ecol. Prog. Ser.* 94:141-154.

Joseph F. Ustach, Ph.D., *Executive Officer, Duke/University of North Carolina Oceanographic Consortium*; B.S., Biological Sciences, Rutgers University; M.S., Zoology, Ph.D., Marine Science, North Carolina State University.

Structure and functioning of wetlands, especially salt marshes, within the estuarine system are of research interest. Major areas of interest include: primary production; decomposition; detritus formation and utilization; habitat utilization; and microbial-meiofaunal interactions.

Heinle, D. R., D. A. Flemer, and J. F. Ustach. 1976. Contribution of tidal marshlands to mid-Atlantic estuarine food chains. In *Estuarine Processes*, M. Wiley (ed.), pp. 309-320. New York: Academic Press.

Ustach, J. F. 1982. Algae, bacteria and detritus as foods for the harpacticoid copepod, *Heteropsyllus pseudonunni* Coull and Palmer. *J. exp. Mar. Biol. Ecol.* 64:203-214.

Ustach, J. F., W. W. Kirby-Smith, and R. T. Barber. 1986. Effect of watershed modification on a small coastal plain estuary. In *Estuarine Variability*, D. Wolfe (ed.), pp. 177-192. New York: Academic Press.





Program of Study



General Information

In today's competitive world, students seek education not only for self-enrichment, but also for career enhancement. Ocean studies can fulfill both needs. The orderly exploitation of the earth's remaining frontier, the oceans, requires not only marine scientists, but increasingly requires managerial, legal, business, and political leaders who understand the oceans. Exploration and research must now be complemented by development, regulation and conservation.

The programs of study offered at Duke Marine Laboratory serve undergraduate majors in the natural sciences or environmental sciences and policy, as well as other undergraduate majors who have an interest in these areas of study and who have adequate preparation. The semester programs (fall or spring) are open to college juniors and seniors; the summer term courses are open to qualified undergraduates. Students from any college or university may apply. For participation in a semester program, it is advised that students have completed introductory college courses in biology, chemistry, and mathematics before attending. The general prerequisites for most of the summer courses are introductory college biology and/or chemistry. Other prerequisites may be specified in the individual course descriptions.

Graduate students may also participate in the fall or spring semesters and summer terms. The 200-level courses are intended for graduate and advanced undergraduate students.

The programs provide students with an opportunity to live and study at the Duke Marine Laboratory year-round. The programs emphasize small class size, independent research, and integrated classroom, laboratory, and field experience. Students have daily access to a specialized faculty, modern scientific equipment, and the surrounding natural marine environment.

Over the last five decades, approximately 5,000 students from over 300 institutions of higher learning have taken course work at the Duke Marine Laboratory. Thousands more have utilized the laboratory's facilities for field trips.

Inquiries concerning the programs of study at the Marine Laboratory may be addressed to Admissions Office, Nicholas School of the Environment Marine Laboratory, Beaufort, North Carolina 28516-9721; telephone 919-504-7502. The director of undergraduate studies and the director of graduate studies are available for consultation.

Course Offerings

The following lists courses normally taught at the laboratory during the designated semester or summer term. For course descriptions and credits, see the course section of this bulletin. Courses numbered 100 to 199 are undergraduate courses. Courses numbered 200 and above are graduate level; however, some 200-level courses are open to undergraduates. Laboratory courses are designated with an (L) appended to the course number; seminars are normally designated with an (S); exceptions, however, occur. Because course offerings are subject to change, students should consult the university course schedule before deciding upon registration.

THE "BEAUFORT TO BERMUDA" SEMESTER

The Marine Laboratory of the Nicholas School of the Environment (Beaufort, N.C.) in cooperation with the Bermuda Biological Station for Research (Ferry Reach, Bermuda) offers a one-semester international study in environmental science and policy at two distinctive locations: Beaufort on the North Carolina coastal plain with its marshlands, estuaries, continental shelf, and the Gulf Stream; Bermuda with its intertidal coral reefs and subtropical mid-ocean environment in the Sargasso Sea. Emphasis will be placed on the rigorous application of the natural and social sciences to the contrasting marine ecosystems and to basic processes and human interventions in the different oceanic systems. The program draws from two marine laboratory traditions in experiential learning for undergraduates and from the expertise of two resident faculties.

The program is open only to undergraduates in their *third* or *fourth* year of study and only to those with adequate preparation in the natural and social sciences. Students will reside at each campus for one-half semester. During the compressed seven-week session, they will take two intensive courses, selected from among five courses offered at each campus. One group will begin the program in Beaufort, the other in Bermuda. At mid-semester the groups will trade campuses. Enrollment is limited. Early application is strongly recommended.

For further information, contact the Admissions Office (919/504-7502; hnear-ing@mail.duke.edu) or the World Wide Web page <http://www.env.duke.edu/marinelab/marine.html>.



FALL SEMESTER

Analysis of Ocean Ecosystems (BIO 123/ENV 293)
Marine Mammals (BIO 126/ENV 226)
Marine Ecology (BIO 129L/ENV 219L/ZOO 203L)
Physiology of Marine Animals (BIO 150L/ENV 228L)
Biochemistry of Marine Animals (BIO 155L/ENV 229L)
Marine Invertebrate Zoology (BIO 176L/ENV 295L)
Marine Animal Navigation (BIO 295S.08/ZOO 295S.08)
Light in the Sea (BIO 295S.24)
Environmental Biochemistry (CBI 243/ENV 243)
Molecular and Cellular Processes in Marine Organisms (CBI 244L/ENV 244L)
Physical Processes in Coastal Environments (ENV 222L/GEO 201L)
Marine Policy (ENV 276/PPS 197)
Geological Oceanography (GEO 205/ENV 291)
Independent Study (BIO/ENV/GEO 191)
Tutorials (BIO 193T, 194T)
Independent Study for Nonmajors (GEO 195)

Graduate research and tutorial courses in various departments are also available.

SPRING SEMESTER

Biological Oceanography (BIO 114L/ENV 292L)
Marine Mammals (BIO 126/ENV 226)
Biochemistry of Marine Animals (BIO 155L/ENV 229L)
The Ecology of Chemical Signals (BIO 296S.26)
Human Impact on the Natural Environment (BIO 296S.54)
Estuarine Ecosystem Processes (ENV 208L)
Coastal Ecotoxicology and Pollution (ENV 225L)
Statistics and Data Analysis in Earth and Ocean Science (ENV 252L/GEO 222L)
Advanced Topics in Nearshore Processes (ENV 268/GEO 204)
Advanced Topics in Marine Ecology (ENV 269S)
Marine Fisheries Policy (ENV 273)
Seminar in Coastal Environmental Management (ENV 398.02)
Beach and Island Geological Processes (GEO 202)
Independent Study (BIO/ENV/GEO 192)
Tutorials (BIO 193T, 194T)
Independent Study for Nonmajors (GEO 195)

Graduate research and tutorial courses in various departments are also available.

FIRST SUMMER TERM

Marine Biology (BIO 10L)
Biological Oceanography (BIO 114L/ENV 292L)
Physiology of Marine Animals (BIO 150L/ENV 228L)
Biochemistry of Marine Animals (BIO 155L/ENV 229L)
Marine Invertebrate Zoology (BIO 176L/ENV 295L)
Cellular and Molecular Research Techniques (CBI 244L/ENV 244L)
Independent Study (BIO/ENV 191; CBI 210)
Tutorials (BIO 193T, 194T)

Graduate research and tutorial courses in various departments are also available.

SECOND SUMMER TERM

Marine Biology (BIO 10L)
Behavioral Ecology (BIO 113L/ENV 223L/ZOO 213L)

Marine Mammals (BIO 126L/ENV 226L)
Marine Ecology (BIO 129L/ENV 219L/ZOO 203L)
Marine Invertebrate Zoology (BIO 176L/ENV 295L)
Barrier Island Ecology (BIO 218L/BOT 218L/ENV 203L)
Independent Study (BIO/ENV 192; CBI 210)
Tutorials (BIO 193T, 194T)

Graduate research and tutorial courses in various departments are also available. Additional courses may be offered.

Application for Enrollment

Application forms for enrollment in semester programs or summer terms at the Marine Laboratory are found at the back of this publication and on the World Wide Web at <http://www.env.duke.edu/marinelab/marine.html>. Admission to Marine Laboratory programs does not constitute admission to undergraduate, professional, or graduate degree programs at Duke University. For further information, see the chapter on admission and financial aid in this bulletin.

Students seeking admission to degree programs at Duke should write or call the appropriate school or department admissions office.



Programs Offered at Duke that Relate to the Marine Laboratory

UNDERGRADUATE DEGREE PROGRAMS

Information and application materials on undergraduate degree programs offered at Duke are found in the *Bulletin of Information for Prospective Students* and the *Bulletin of Duke University-Undergraduate Instruction*, including information on available majors and financial aid. To obtain application materials and information, contact: Office of Undergraduate Admissions, 2138 Campus Drive, Duke University, Box 90586, Durham, North Carolina 27708-0586; telephone 919-684-3214.

Undergraduate majors that relate to ocean studies are listed below and detailed in the *Bulletin of Duke University-Undergraduate Instruction*; additional information is also available as follows:

Biology Major. (An area of concentration in marine biology includes a semester or summer session at Duke Marine Laboratory): Director of Undergraduate Studies in Biology, Biological Sciences Building, Duke University, Box 90324, Durham, North Carolina 27708-0324; telephone 919-684-5212

NOTE: Duke students are directed to literature in the Undergraduate Studies Office, Biology Major Program (Biological Sciences Building) for information about requirements fulfilled by courses at the Marine Laboratory for the biology major.

Environmental Sciences and Policy Major. (Field experiences may include a semester or summer session at Duke Marine Laboratory): Director of Undergraduate Studies, Nicholas School of the Environment, Levine Science Research Center, Duke University, Box 90328, Durham, North Carolina 27708-0328; telephone 919-613-8060.

Geology Major. (A marine geology option includes a semester at Duke Marine Laboratory): Director of Undergraduate Studies, Department of Geology, Old Chemistry Building, Duke University, Box 90230, Durham, North Carolina 27708-0230; telephone 919-684-5847.

PROFESSIONAL DEGREE PROGRAMS

The Nicholas School of the Environment offers a Master of Environmental Management (M.E.M.) degree with a program concentration in Coastal Environmental Management. This program usually entails a first year of study on the Durham campus, and a second year of study at the Duke Marine Laboratory. The program is tailored to individual interests and includes courses in both the natural and social sciences. It is described in the *Bulletin of Duke University-Nicholas School of the Environment*. Application is made through the Nicholas School of the Environment, Durham campus. Additionally, students in other professional degree programs within the Nicholas School of the Environment often take courses offered at the Marine Laboratory.

Professional Program Applications. Enrollment Services, Nicholas School of the Environment, A142 Levine Science Research Center, Duke University, Box 90330, Durham, North Carolina 27708-0330; telephone 919-613-8070.

Coastal Environmental Management Program Information. Dr. Michael K. Orbach, Director, Coastal Environmental Management Program, Duke University Nicholas School of the Environment Marine Laboratory, 135 Duke Marine Lab Road, Beaufort, North Carolina 28516-9721; telephone 919-504-7605.



GRADUATE DEGREE PROGRAMS

Graduate students from all academic disciplines are encouraged to study at the Marine Laboratory year-round. Graduate degree candidates may take advantage of course work in the marine sciences as well as coastal and marine policy, an active seminar program, and facilities supporting dissertation research.

Resident graduate students represent the Nicholas School of the Environment and the Departments of Botany, Cell Biology, Geology, and Zoology. Ordinarily, dissertation advisers are resident as well. Although residency of the advisor is not necessary to study at the Marine Laboratory, some sources of funding are contingent upon an advisor from the laboratory's resident faculty. Students in graduate programs may elect to spend a year or more at the Durham campus before taking residence at the Marine Laboratory; however, residence in Durham is not a requirement.

The Marine Laboratory awards full-time fellowships which pay a stipend, tuition, and fees. Students are required to serve as a teaching assistant for two courses for each academic year's payment. Tuition credits obtained from fellowship support may be applied to courses given both at the Marine Laboratory and the Durham campus, regular semesters and summer terms.

Application should be made through the Graduate School. Additional information is available from the director of graduate studies in the department of interest (see below), as well as from the director of graduate studies at the Marine Laboratory. Also, consult the current *Duke Graduate School Bulletin of Information for Graduate Studies*, the *Bulletin of Duke University-Graduate School*, and the *Bulletin of Duke University-Medical School*.

Within the Duke Graduate School, specialization in marine science may be conducted through the following departments: Botany (A.M. [nonthesis], M.S. [thesis], and Ph.D.); Cell Biology (Ph.D.); Environment (Ph.D.; M.S. available as part of a Ph.D. program; Ph.D. may include focus on coastal and marine policy); Geology (M.S., Ph.D.); or Zoology (Ph.D.; A.M. or M.S. degree may be taken by students en route to the Ph.D., or by those who leave the doctoral program).

Individuals interested in the area of cell biology within the Medical School should contact the director of graduate studies (see below) for additional information.

Graduate School Applications. Office of Graduate Admissions, Graduate School, 127 Allen Building, Duke University, Box 90063, Durham, North Carolina 27708-0063; telephone 919-684-3913.

Medical School Applications. Admissions Office for Medical Education, School of Medicine, Duke University Medical Center, Box 3710, Durham, North Carolina 27710; telephone 919-684-2985.

For further information on Graduate Programs:

Botany. Director of Graduate Studies, Department of Botany, 139 Biological Sciences Building, Duke University, Box 90342, Durham, North Carolina 27708-0342; telephone 919-684-6518.

Cell Biology. Director of Graduate Studies, Department of Cell Biology, Duke University Medical Center, Box 3011, Durham, North Carolina 27710; telephone 919-684-5207.

Environment. Enrollment Services, Nicholas School of the Environment, A142 Levine Science Research Center, Duke University, Box 90330, Durham, North Carolina 27708-0330; telephone 919-613-8070.

Geology. Director of Graduate Studies, Department of Geology, Old Chemistry Building, Duke University, Box 90230, Durham, North Carolina 27708-0230; telephone 919-684-5847.

Marine Laboratory. Director of Graduate Studies, Duke University Nicholas School of the Environment Marine Laboratory, 135 Duke Marine Lab Road, Beaufort, North Carolina 28516-9721; telephone 919-504-7502.

Zoology. Director of Graduate Studies, Department of Zoology, 108 Biological Sciences Building, Duke University, Box 90325, Durham, North Carolina 27708-0325; telephone 919-684-3649 or 684-2507.

INTEGRATED TOXICOLOGY PROGRAM

Duke University offers an interdisciplinary doctoral and postdoctoral program in human and environmental toxicology. The Integrated Toxicology Program faculty comprises members of the Departments of Anesthesiology, Biochemistry, Cellular and Molecular Biology, Chemistry, Medicine, Neurobiology, Pathology, Pharmacology, and the Nicholas School of the Environment (Durham and Marine Laboratory campuses). Students seeking admission to the program as a Ph.D. candidate make initial application to the Graduate School for admission to a specific department.

Research in environmental toxicology in the Nicholas School of the Environment focuses on molecular and biochemical aspects of pollutant metabolism, adaptation, and modes of toxic action. The majority of this work employs freshwater, marine, and terrestrial organisms as toxicological models. The goals are to achieve fundamental understanding of processes governing the fates and effects of contaminants in ecosystems, and to elucidate linkages between ecosystem and human health.

Training in environmental toxicology is available to professional students through the Master of Environmental Management (M.E.M.) program in Environmental Toxicology, Chemistry and Risk Assessment in the Nicholas School of the Environment.

Admission and Registration



Fall and Spring Semester Programs

The semester programs are open to qualified college juniors and seniors and graduate students who wish to enroll in courses offered during the spring or fall. Students intending to apply to the semester programs should have completed college courses in introductory biology, chemistry, and mathematics. Applications should be received by about mid-October for the spring semester and by about mid-March for the fall semester. There are no deadlines for applications but they are considered in the order in which they are received. Admission continues until maximum enrollment is reached, after which a waiting list is formed.

For undergraduates, a full program of study ordinarily consists of four courses.

SEMESTER PROGRAM ADMISSION

Duke Undergraduates. Duke students should submit the semester program application (found at the back of this publication or on the World Wide Web at <http://www.env.duke.edu/marinelab/marine.html>) to the Admissions Office of the Marine Laboratory prior to Duke's registration period for the desired semester. Notification of admission will be sent to the applicant as well as the Duke registrar's office. Students will then need to register at the normal designated time through ACES (Automated Computer Enrollment System).

Duke Graduate Students. Students enrolled in a graduate degree program at Duke who wish to enroll in semester program courses offered at the Marine Laboratory should notify the Marine Laboratory Admissions Office of such intent and specify the courses of enrollment prior to Duke's registration period for that semester. Students will need to register through ACES at the normal designated time.

Non-Duke Undergraduates. Non-Duke students must submit the semester program application (found at the back of this publication), one letter of recommendation from faculty at their home institution, and a current academic transcript to the Admis-

sions Office of the Marine Laboratory. Upon receipt of these credentials, the application will be processed for admission and notification will be sent to the applicant. Students will be categorized as nondegree (unclassified) students and registered for the specific semester at Duke.

Summer Programs

Summer courses offered at the Marine Laboratory are open to qualified college undergraduates, graduate students, and individuals who already hold an undergraduate or graduate degree. The summer program is not open to high school students.

Introductory-level courses are numbered below 100; advanced-level courses are numbered 100 and above. Courses numbered from 200 to 299 are primarily for advanced undergraduates and graduate students; undergraduates may not enroll in courses numbered 300 or higher. The predominant prerequisites for the summer courses are introductory college biology and/or chemistry. Other prerequisites may be required. These are listed in the specific course description.

Individuals interested in enrolling in courses offered during the first summer term are advised to submit their application and supporting credentials during late fall or winter to assure space in the desired course. Many courses reach maximum enrollment early in the admissions process. Individuals may apply for admission to one or more of the summer terms. Due to time constraints, registration in only one course per summer term is possible.

Summer Credit. The summer session credit does not mean degree credit at Duke University unless the student has been admitted as a degree candidate by one of the colleges or schools of the university. Other students will be categorized as nondegree (unclassified) students for the summer only. A student taking a course for credit is expected to complete all of the work required and to take the final examination, and will receive a grade.

Summer Minimum Enrollment. Some courses are offered subject to minimum enrollments. Should it become necessary to withdraw a course not having adequate enrollment, every effort will be made to place the student in an alternate course that has been listed by the student as a second choice.

Summer Maximum Enrollment. If a course reaches maximum enrollment, subsequent applicants will be placed on a waiting list. Applicants should list first and second choice course preferences on their application. It is advisable for students applying to the first summer term to apply during late fall or early winter.

Summer Maximum Program Load. The maximum load for one summer term at the Marine Laboratory is a one and one-half course program (6 semester hours/units).

SUMMER PROGRAM ADMISSION

The summer application (found at the back of this publication or on the World Wide Web at <http://www.env.duke.edu/marinelab/marine.html>) must be submitted to the Marine Laboratory Admissions Office by all individuals applying to undergraduate and graduate courses or graduate graded research to be conducted at the Marine Laboratory. A current academic transcript is required to complete the application. These credentials may be sent separately or together.

Upon receipt of all credentials, the application will be processed for admission and notification will be sent to the applicant. Applicants are encouraged to apply early to allow for adequate processing time and to gain admission in the desired course(s). Upon acceptance, payment of the required deposit(s) is essential to reserve space in a course as well as room and board accommodations.

Duke students should note that ACES will not be available for summer course registration at the Nicholas School of the Environment Marine Laboratory. Registration information will be provided to the Duke Office of the Registrar at the appropriate time.

Immunization Requirement (Semester and Summer Programs)

The North Carolina immunization law requires students attending a college or university in the state to be immunized against the following diseases: measles, rubella, tetanus, diphtheria, and, in some cases, polio. Students from institutions other than Duke are required to present proof of these immunizations in accordance with the instructions contained in the Student Health Services form provided with the student's admissions materials. This form should be completed and returned to Student Health Services prior to the student's first day of classes. Duke University cannot permit a student to attend classes unless the required immunizations have been obtained.

Transcripts of Credit

Requests for official transcripts of course work completed at the Marine Laboratory should be directed to the Office of the Registrar, 103 Allen Building, Duke University, Box 90055, Durham, North Carolina 27708-0055. Requests must be written and include name, social security number, class level, address to which the transcript should be sent, and written signature. The fax machine (919-684-4500; no cover sheet necessary) is on twenty-four hours per day, seven days per week. **Transcript requests should not be directed to the Marine Laboratory.**

The registrar **cannot** fax transcripts. Ten days should be allowed for processing.

Transcripts may be withheld for an individual whose student loan account is past due. Non-Duke students are charged a one-time \$30 fee (fall or spring term) or \$15 fee (summer term) for transcripts.



Financial Information



The figures quoted in this section are based on costs applicable in academic year 1996-97 and are projections in some cases; they may be subject to change without prior notice.

Fall and Spring Semester Programs

Costs for undergraduate students, per semester:

Tuition	\$10,260
Health fee	200
Student activity fee	60
Room and board	3,150
Key deposit	10
Books (estimated)	450
Residential License Fee (security deposit)	100

Room and Board. All dormitory occupants must supply their own linens, blankets, and towels, but pillows will be furnished. A key deposit of \$10 (per semester) will be charged each person occupying a room. This deposit will be refunded at the time of departure and return of key.

Full board provides for three meals a day. No credit will be allowed for meals that are missed. However, board is adjusted for holidays (i.e., students may stay in the dormitory during breaks and Thanksgiving holidays but the dining hall is not open). Rooms are paid for from the terms' beginning to end.

Books. Books, if required by the instructor, will be available after arrival.

Payment of Tuition and Fees. The Office of the Bursar (Duke University, Durham campus) will issue invoices to registered students for tuition, fees, and other charges approximately four to six weeks prior to the beginning of classes each semester. The total amount due on the invoice is payable by the invoice late payment date which is normally one week prior to the beginning of classes. Inquire at the Office of the Bursar, 919-684-3531, if an invoice has not been received three weeks prior to the first day of classes, so that payment can be forwarded while a duplicate invoice is issued to document the balance owed.

As part of the admission agreement with Duke University, a student is required to pay all invoices as presented. If full payment is not received, a late payment charge as described below will be assessed on the next invoice and certain restrictions as stated below will be applied. Failure to receive an invoice does not warrant exemption from the payment of tuition and fees nor from the penalties and restrictions. (Duke University students on other

tuition payment plans see the current *Bulletin of Duke University-Undergraduate Instruction*.) Nonregistered students will be required to make payment for tuition, fees, required deposits, and any past due balance at the time of registration. Payments should be sent to the address indicated on the invoice and not to the Duke Marine Laboratory.

Late Payment Charge. If the total amount due on an invoice is not received by the invoice late payment date, the next invoice will reflect a penalty charge of 1 and 1/4 percent per month assessed on the past due balance regardless of the number of days past due. The past due balance is defined as the previous balance less any payments and credits received on or before the late payment date and also any student loan or scholarship memo credits related to the previous balance which appear on the invoice.

Summer Programs

The following charges are applicable for undergraduate and graduate summer registration, per term:

Tuition :

a. For each one and one-half course (6 s.h.)	\$2,970
b. For each undergraduate laboratory course (4 s.h.)	1,980
c. For each nonlaboratory course (3 s.h.)	1,485
d. For each half-course (2 s.h.)	990
e. For a graduate course, per unit (s.h.)	495

Health fee	60
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Room and board (estimated)	1,100
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Key deposit	10
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Books (estimated)	200
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Residential License Fee (security deposit)	100
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Auditing Fees.

1. With permission of the instructor and the director, students registered for a full program (6 s.h.) may audit courses. No extra charge is made.
2. Students carrying less than a full program (6 s.h.) may be granted permission by the instructor and the director to audit a course, but must pay half the university fee for the course.

Room and Board. Total charges for room and board are estimated at \$1,100 per term, or higher. Upon acceptance in a course, students will be sent an acceptance and reservation form. Reservation for housing and board should be made on this form and the form promptly returned to the Marine Laboratory along with the room and board reservation deposit, if the student elects to use room and board. Reservations are made on a first-come, first-served basis.

All dormitory rooms are air-conditioned. Occupants must supply their own linens, blankets, and towels, but pillows will be furnished. Full board provides for three meals a day. There will be no credit allowed for missed meals.

Books. Books, if required by the instructor, will be available at registration. An estimate of costs for books is approximately \$200.

Deposits.

1. **Course Deposit.** Upon acceptance in a course, a nonrefundable deposit of \$150 (per course) is required to ensure a reservation in that course. If the student properly registers for the course and attends, the deposit will be credited to tuition.

2. **Room and Board Deposit.** A \$100 deposit (per term) is required to ensure a reservation for room and board. If the student properly registers, the deposit will be credited to the room and board charge. The deposit is refundable if a student who has previously made a room and board reservation properly withdraws from a course prior to the beginning of the term. The deposit is nonrefundable if a student who has previously made a room and board reservation at the Marine Laboratory subsequently decides not to utilize the room and board facilities (although he or she still plans to attend the course) and does not notify the Marine Laboratory at least two weeks prior to the beginning of the term.
3. **Key Deposit.** A key deposit of \$10 per term will be charged each person occupying a dormitory room. This deposit will be refunded at time of departure and return of the key.

Payment of Tuition and Fees. Duke University Marine Laboratory does not mail statements for summer term tuition and fees. All tuition and fees (which students must calculate from the information in their admissions materials) must be paid to the Accounting Office, Duke University Nicholas School of the Environment Marine Laboratory, 135 Duke Marine Lab Road, Beaufort, North Carolina 28516-9721 on or before the Friday preceding the beginning of each summer term (see Duke University Marine Laboratory calendar for term dates). Checks should be made payable to Duke University Marine Laboratory and may be mailed to the above address.

Students who plan to pay for tuition and/or fees, or a portion thereof, through other than personal means or scholarship support provided by Duke Marine Laboratory, such as student loans or other types of financial assistance not provided by the Marine Laboratory, should notify the Duke Marine Laboratory accounting office prior to the payment due date and specify their form of payment. Such students must bring with them to the Marine Laboratory copies of any documents, such as approved student loans, etc., which relate to the payment of Duke Marine Laboratory summer tuition and fees.

Failure to pay tuition and fees by the end of the drop/add period (*the third day of classes in any term*) will result in administrative withdrawal of the student. These withdrawn students will be billed the health fee and an administrative withdrawal fee of \$225 (per 6 semester hour course), \$150 (per 3-4 semester hour course), or \$75 (per 2 semester hour course) and receive a W for each course for which they were registered. Students who, subsequent to withdrawal, clear with the Marine Laboratory accounting office may, with written permission of their academic dean, be reinstated in their classes as originally registered and receive regular grades instead of Ws. The administrative withdrawal fee will stand and the student will be liable for full tuition and fees. Students who are unable to meet these deadlines should consult with the accounting office and their academic dean (in the case of Duke University students) prior to the deadline.

Late Payment Charge. Students who fail to pay all tuition and fees on or before the Friday preceding the beginning of each term will pay an extra charge of \$100.

Refunds

Fall and Spring. In the case of withdrawal from the university, students or their parents may elect to have tuition refunded or carried forward as a credit for later study according to the following schedule:

Withdrawal Refund

Before classes begin	Full amount
During first or second week	80 percent
During third, fourth, or fifth week	60 percent
During sixth week	20 percent
After sixth week	None

Tuition charges paid from grants or loans will be restored to those funds on the same pro rata basis and will not be refunded or carried forward. In addition to tuition, the schedule also applies to other Marine Laboratory fees. In the event of death, a full tuition and fees refund will be granted. Consult the *Bulletin of Duke University-Undergraduate Instruction* for additional information.

Summer Terms—Drop or Administrative Withdrawal Charges and Refund of Tuition and Fees. Students who will not be attending a summer term or course for which they have been officially accepted must drop the course(s) prior to the beginning of the term whether or not they have paid tuition and fees. Students who fail to drop the course(s) prior to the beginning of the term will be charged \$225 (per 6 semester hour course), \$150 (per 3-4 semester hour course), or \$75 (per 2 semester hour course).

Students who will not be attending a summer term or course for which tuition and fees have been paid are eligible for refunds following these policies:

1. There is no refund of tuition and fees if the student drops a course(s) or withdraws from the term after the third day. After the first week of the term, the room and board fee less the cost of each week of room and board (a week of room and board is considered Sunday-Saturday) is refunded.
2. Full tuition less \$225 (for a 6 semester hour course), \$150 (for a 3-4 semester hour course), or \$75 (for a 2 semester hour course) is refunded if the student officially drops a course(s) or withdraws from the term during the first three days; the room and board fee less the cost of one week of room and board will also be refunded. The health fee is not refunded. (There is no charge for drop/adds that result in no change in course load in the same term).
3. Full tuition and fees are refunded if the student officially drops a course(s) or withdraws from the term before the first day of the term.

Check Cashing

The banks in the Beaufort-Morehead City area have indicated that they will not cash personal checks for students unless the checks are guaranteed. Therefore, it is recommended that students who come to the laboratory bring with them sufficient travelers' checks, money orders, certified checks (which the banks will cash), or cash to cover personal expenses. The Marine Laboratory will accept personal checks to pay course fees and other accounts, but cannot convert personal checks for cash purposes. Additionally, the Marine Laboratory cannot accept credit cards for payment of accounts.

Financial Assistance

UNDERGRADUATE FINANCIAL AID

Financial aid is generally available to Duke University undergraduate students for each summer term. Interested students can obtain specific details on available funding and an application through the Duke University Financial Aid Office (Durham campus) in March of each year.

SUMMER TUITION SCHOLARSHIPS AND FELLOWSHIPS FOR UNDERGRADUATE AND GRADUATE STUDENTS

The summer tuition scholarships and fellowships listed below are awarded on a competitive basis by the Nicholas School of the Environment Marine Laboratory. Each award provides tuition for one course taken during the summer. Awards require that undergraduates live on campus, i.e., take room and board at the Marine Laboratory. The criteria used in review of scholarship/fellowship applicants are academic excellence, scope of preparation, professional goals, and need. Awardees are selected by the Marine Laboratory faculty.

Preconditions for review of a scholarship/fellowship application are admission to a specific summer course and submission of the \$150 course deposit. (Admission to courses does not automatically imply award of a scholarship or fellowship; separate reviews are conducted.)

There is no separate scholarship/fellowship application form. Intent to apply for a scholarship/fellowship should be made known on the reverse of the summer course application found at the back of this publication. In addition to the summer application for courses, each scholarship/fellowship applicant is required to submit (1) college or professional school transcript(s), (2) a letter of recommendation from academic faculty, and (3) a brief statement of purpose, i.e., the reason for taking the particular course. All scholarship/fellowship credentials must be received no later than 1 March by the admissions office of the Marine Laboratory. All scholarship applicants will be notified by mail concerning their award status shortly after the deadline date.

In addition, the Richard C. and Linda G. Seale Scholarship is intended to provide support to qualified students from Denison University for participation in summer courses at the Duke Marine Laboratory. Denison University students interested in applying for this scholarship are directed to the Chairman, Department of Biology, at Denison University with respect to required supporting credentials and deadlines for application and award notification. Should there be no applicants from Denison, the scholarship may be used to provide financial assistance to any qualified student.

Lawrence E. Blanchard Endowment Fund. The fund income is used to support undergraduate students in academic courses at the Duke University Marine Laboratory.

Bookhout Scholarship. The Bookhout Scholarship provides financial assistance to juniors, seniors, or beginning graduate students with a professional interest in the natural sciences.

August A. Busch, Jr., Memorial Scholarship Fund. The income provides unrestricted scholarship support for undergraduates studying at the Duke University Marine Laboratory.

Laura J. Grierson Memorial Fund. The fund income is used to support undergraduate students in academic independent study courses at the Duke University Marine Laboratory.

Lawrence I'Anson Scholarship Endowment Fund. The income provides unrestricted scholarship support for undergraduates studying at the Duke University Marine Laboratory.

Melanie Elizabeth Lynn Memorial Scholarship. The Melanie Elizabeth Lynn Memorial Scholarship provides financial assistance to female graduate students for summer academic course work.

Mary Derrickson McCurdy Scholarship. The Mary Derrickson McCurdy Scholarship provides financial assistance to undergraduate students for academic course work.

Richard C. and Linda G. Seale Scholarship Endowment Fund. The fund income is used to support qualified Denison University students in academic summer courses at the Duke University Marine Laboratory. In the event that there are no students from Denison who apply or who are qualified for the scholarship, such income may be used to provide financial assistance to any qualified student.

Harvey W. Smith Undergraduate Fellowship in Biological Sciences. The income from this fund is used to support undergraduate participation in academic courses.

Deborah Susan Steer Memorial Scholarship in Marine-Life Sciences. Each year the income from the fund is used to provide financial assistance to promising Duke

undergraduates who wish to study marine life-sciences at the Duke University Marine Laboratory.

John A. and Elizabeth F. Taylor Foundation Fellowship. The fellowship provides support to rising junior science majors (either [1] enrolled in a Tampa Bay area college or university, or [2] whose home is in the Tampa Bay area but attending college away from home) for a two-summer training and research commitment. The first summer consists of training at the Duke University Marine Laboratory in formal course work and research in the marine sciences. The second summer consists of independent research on water quality or fisheries at the Clearwater Marine Science Center, Clearwater, Florida. The stipend provides for complete tuition, travel, and subsistence allowance for both summers. Applicants must submit (1) a letter of intent, including a statement of how the experience would strengthen the candidate's life goals; (2) college transcript(s); and (3) the names of three references, including addresses and phone numbers. The deadline for application is 1 February. Application materials should be submitted to Dr. Andrew J. Read, Duke University Nicholas School of the Environment Marine Laboratory, 135 Duke Marine Lab Road, Beaufort, North Carolina 28516-9721.

The Wade Family Fund. The income from this fund is used to support undergraduate and graduate student participation in academic courses.

FULL-TIME GRADUATE SUPPORT

Full-time (academic year, including summer) graduate support is available to students registered in a graduate program at Duke University. Recipients usually reside in Beaufort after their course work is completed on the Durham campus and base their research at the Beaufort campus. Support is considered on a case-by-case basis and generally is guaranteed to students making satisfactory progress and whose advisors are resident at the Duke Marine Laboratory. Support is available in the form of Duke University Marine Laboratory instructional assistantships. Awards are made annually. Eligibility is for five years.

Applicants making satisfactory progress should submit a letter of request for support in response to the announcement of funding that is made to students and faculty in January or February of each year. Further documentation may be requested of students whose progress is uncertain. For further information, write the Director of Graduate Studies, Duke University Nicholas School of the Environment Marine Laboratory, 135 Duke Marine Lab Road, Beaufort, North Carolina 28516-9721.

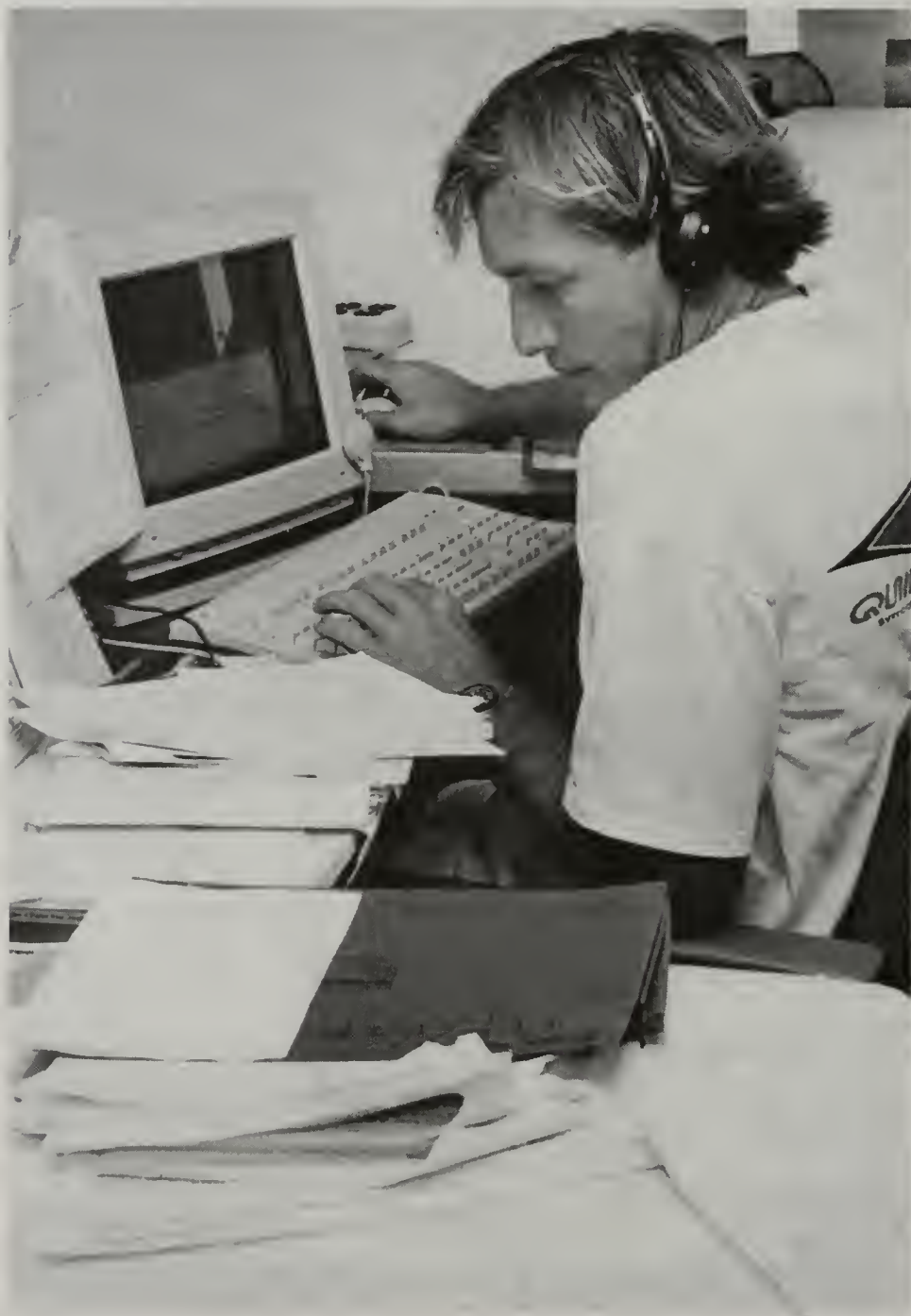
POSTDOCTORAL SUPPORT

Mary Derrickson McCurdy Visiting Fellow. To enhance the mission of the School of the Environment, Duke University seeks scholars-in-residence to enrich the emerging curriculum at the Marine Laboratory in ocean science aspects of issues related to the environment and living resources. Ideally, the scholar will teach an innovative seminar in the fall and spring semesters and perform collaborative research with students. The curriculum is designed for advanced undergraduate, professional and graduate students.

The funds available are ideal for a postdoctoral year or a sabbatical leave, and can be used for salary and research. Applicants should send a course prospectus, a research prospectus, a curriculum vitae and a list of references to the director of the Marine Laboratory by 1 January for the following academic year.



*Additional Information for Visiting
Scholars and Researchers*



The figures quoted in this chapter are applicable in academic year 1996-97 and are projections in some cases; they may be subject to change without prior notice.

Visiting Scholar Programs

The exchange of knowledge is kept lively by several programs which bring distinguished scientists/educators to the Marine Laboratory. The Visiting Scholar Program brings lecturers for a period of several days on a monthly basis year-round. The Mary Derrickson McCurdy Visiting Fellow is in residence one year or more. The scholars, while in residence, lecture to the community at large as well as enrich specific research groups. For information on financial support for visiting scholars, see the section entitled Postdoctoral Support in the chapter, Financial Information.

Research Space. Research space, including seawater tables, is available on a limited basis for Duke University Marine Laboratory visitors. Research space rent for all users is \$3.50 per square foot per month. The typical size of a laboratory-office area is 100 square feet.

Teaching Space. Classrooms of various sizes are available throughout the year; however, first priority must be given to Marine Laboratory classes when they are in session. Cost for such space is \$40 per day. Compound or dissecting microscopes are available at a "flat rate" of \$20 a day.

Room and Board. All Duke University Marine Laboratory visitors who stay on the island will pay a room and board fee as follows: \$40 per day (1-6 days); \$220 per week (7+ days). Allowances will be made only for meals missed at the beginning and end of the stay.

Boat Rentals. The following boats are available to visiting researchers for collecting and instructional activities. The boats may be scheduled through the Maintenance

Office; however, first priority must be given to classes when they are in session. These rates are intended to partially defray the cost of operations and maintenance.

Charges apply to all research and teaching activities. Use of Duke University Marine Laboratory vessels for any sponsored research will be subject to charges.

Boat Type	Charge per Hour
57-ft. research/training (R/V <i>Susan Hudson</i>)	\$70
24-ft. outboard runabout (1)	35
20-ft. outboard runabout (1)	25
Outboard skiffs (5)	6

Off-Campus Housing. The Bradley International House, a complex of seven apartment units, is operated by the Marine Laboratory to accommodate visiting researchers and instructors. It is located within walking distance of the Marine Laboratory and in the historic district of the town of Beaufort. The complex was designed to promote collegiality among academics and to enhance the historic district. The Bradley International House was dedicated in 1992, and was constructed with funds provided by the Lynde and Harry Bradley Foundation of Milwaukee, Wisconsin.

The units are fully furnished, including linens and utensils. One-bedroom apartments rent for \$350 per month plus utilities, and two-bedroom units rent for \$400 per month plus utilities. The preferred occupancy is one month or more.

Information and Reservations. All requests for use of facilities or equipment at the Marine Laboratory, including the Bradley International House, should be addressed to Auxiliaries and Administrative Services, Duke University Nicholas School of the Environment Marine Laboratory, 135 Duke Marine Lab Road, Beaufort, North Carolina 28516-9721; telephone (919) 504-7504. Requests for the use of boats should be scheduled through Karen D. Ashleely (919) 504-7583 or e-mail to karena@duncoc.ml.duke.edu.



Courses of Instruction



Courses Taught at the Marine Laboratory

Course offerings are subject to change. The student should consult the current university course schedule for listings of courses to be offered each semester or summer term.

Biology

10L. Marine Biology. Physical and chemical characteristics of marine ecosystems and the functional adaptations of marine organisms to these systems. Lectures, field trips, and laboratories. For students not majoring in a natural science. (Given at Beaufort.) C-L: Marine Sciences. One course. *Kenney*

113L. Behavioral Ecology. How ecological factors shape foraging, mating, aggressive, and social behavior. Laboratory experiments and field observations from the Outer Banks environment. Independent projects and seminars. (Given at Beaufort in the summer.) Prerequisite: Biology 25L. C-L: Marine Sciences. One and one-half courses. *Rubenstein (visiting summer faculty)*

114L. Biological Oceanography. Physical, chemical, and biological processes of the oceans, emphasizing special adaptations for life in the sea and factors controlling distribution and abundance of organisms. One course (spring); one and one-half courses (summer). (Given at Beaufort.) Prerequisite: Biology 25L. C-L: Marine Sciences. Variable credit. *Ramus or staff*

123. Analysis of Ocean Ecosystems. The history, utility, and heuristic value of the ecosystem; ocean systems in the context of Odum's ecosystem concept; structure and function of the earth's major ecosystems. (Given at Beaufort.) Prerequisite: one year of biology, one year of chemistry, or consent of instructor. C-L: Marine Sciences. One course. *Barber*

126. Marine Mammals. Ecology, social organization, behavior, acoustic communication, and management issues. Focused on marine mammals in the southeastern

United States (for example, bottlenose dolphin, right whale, West Indian manatee). (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. One course. *Read or staff*

126L. Marine Mammals. Laboratory version of Biology 126. (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. One course. *Read or staff*

129L. Marine Ecology. Factors that influence the distribution, abundance, and diversity of marine organisms. Course structure integrates lectures, field excursions, and independent research projects. Topics include characteristics of marine habitats, adaptation to environment, species interactions, biogeography, larval recruitment, rocky shores, marine mammals, fouling communities, tidal flats, beaches, subtidal communities, and coral reefs. Not open to students who have taken Biology 203L. One course (fall and spring); one and one-half courses (summer). (Given at Beaufort.) Prerequisite: none; suggested—introductory ecology, invertebrate zoology, or marine botany. C-L: Marine Sciences. Variable credit. *Staff*

150L. Physiology of Marine Animals. Environmental factors, biological rhythms, and behavioral adaptations in the comparative physiology of marine animals. One course (fall); one and one-half courses (summer). (Given at Beaufort.) Prerequisites: Biology 25L and Chemistry 12L. C-L: Marine Sciences. Variable credit. *Forward*

155L. Biochemistry of Marine Animals. Functional, structural, and evolutionary relationships of biochemical processes of importance to marine organisms. One course (fall and spring); one and one-half courses (summer). (Given at Beaufort.) Prerequisites: Biology 25L; and Chemistry 11L, 12L. C-L: Marine Sciences. Variable credit. *Rittschhof*

176L. Marine Invertebrate Zoology. Structure, function, and development of invertebrates collected from estuarine and marine habitats. Not open to students who have taken Biology or Zoology 274L. One course (fall); one and one-half courses (summer). (Given at Beaufort.) Prerequisite: Biology 25L. C-L: Marine Sciences. Variable credit. *Kirby-Smith (environment)*

191, 192. Independent Study. For junior and senior majors with consent of director of undergraduate studies and supervising instructor. Three courses of 191, 192, 193T, and 194T, maximum. Variable credit. *Staff*

193T, 194T. Tutorial. For junior and senior majors with consent of director of undergraduate studies and supervising instructor. Three courses of 191, 192, 193T, and 194T, maximum. Variable credit. *Staff*

218L. Barrier Island Ecology. An integration of barrier island plant and animal ecology within the context of geomorphological change and human disturbance. Topics include: barrier island formation and migration, plant and animal adaptations, species interactions, dune succession, maritime forests, salt marshes, sea level rise, conservation policy, and restoration ecology. Field trips to many of the major North Carolina barrier islands. Strong emphasis on field observation and independent research. (Given at Beaufort.) Prerequisite: Biology 25L or equivalent; suggested: course in botany or ecology. C-L: Environment 218L and Marine Sciences. One and one-half courses. *Evans, Peterson, and Wells (visiting summer faculty)*

274L. Biology of Marine Invertebrates. Systematic survey of the principal marine invertebrate taxa, with emphasis on structure, function, behavior, and ecology. Field trips and independent projects. Not open to undergraduates who have taken Biology 176L. (Given at Beaufort.) Prerequisite: introductory biology (Biology 25L). C-L: Environment 297L and Marine Sciences. One and one-half courses. *Dimock (visiting summer faculty)*

295S, 296S. Seminar. Variable credit. *Staff*

COURSES CURRENTLY UNSCHEDULED

169L. Marine Communities

Botany

218L. Barrier Island Ecology. An integration of barrier island plant and animal ecology within the context of geomorphological change and human disturbance. Topics include: barrier island formation and migration, plant and animal adaptations, species interactions, dune succession, maritime forests, salt marshes, sea level rise, conservation policy, and restoration ecology. Field trips to many of the major North Carolina barrier islands. Strong emphasis on field observation and independent research. (Given at Beaufort.) Prerequisite: Biology 25L or equivalent; suggested: course in botany or ecology. C-L: Environment 218L and Marine Sciences. 6 units. *Evans, Peterson, and Wells (visiting summer faculty)*

295S, 296S. Seminar. Credit to be arranged. Variable credit. *Staff*

359, 360. Research in Botany. Individual investigation in the various fields of botany. Credit to be arranged. C-L: Marine Sciences. Variable credit. *All members of the graduate staff*

Cell Biology

210. Independent Study. Directed reading and study in cell biology/physiology. Descriptions of specific areas may be obtained from the director of graduate studies. Consent of director of graduate studies required. 3 to 9 units each. C-L: Marine Sciences. Variable credit. *Staff*

243. Environmental Biochemistry. Introduction to the (macro)molecules of life and fundamental metabolic pathways. Topics are presented in the context of environmental perturbations. Fundamental aspects of energetics, proteins, enzymes, carbohydrates, lipids, and nucleic acids. Emphasis on mechanisms of adaptation, molecular controls, and responses to toxicants. (Given at Beaufort.) Prerequisite: organic chemistry. C-L: Environment 243 and Marine Sciences. One course or 3 units. *C. Bonaventura*

244L. Molecular and Cellular Processes in Marine Organisms. Joint research projects on the adverse effects of environmental pollutants on marine organisms at the cellular and molecular level. Research methodologies include: spectroscopy (UV/VIS, fluorescence, and atomic absorption); subcellular fractionation; protein purification and characterization using chromatography and electrophoresis; analysis of pollutant-induced damage to proteins, membranes, and DNA; measurement of activity of enzymatic defense systems. Lectures cover molecular mechanisms of damage and damage control, and concepts that underlie the methods to be used. (Given at Beaufort.) Prerequisite: organic chemistry. C-L: Environment 244L and Marine Sciences. One course or 4 units. *C. Bonaventura and McClellan-Green*

Environment

191, 192. Independent Study. Open to qualified juniors and seniors with consent of instructor and director of undergraduate studies. Variable credit. *Staff*

208L. Estuarine Ecosystems Processes. A study of the physical, chemical, and biological processes that control the structure of estuarine communities. Emphasis on field and laboratory techniques and data interpretation. (Given at Beaufort.) Prerequisite: ecology, systematics, or field biology course or consent of instructor. C-L: Marine Sciences. One course or 4 units. *Kirby-Smith*

218L. Barrier Island Ecology. An integration of barrier island plant and animal ecology within the context of geomorphological change and human disturbance. Topics include: barrier island formation and migration, plant and animal adaptations, species interactions, dune succession, maritime forests, salt marshes, sea level rise, conservation policy, and restoration ecology. Field trips to many of the major North Carolina barrier islands. Strong emphasis on field observation and independent research. (Given at Beaufort.) Prerequisite: Biology 25L or equivalent; suggested: course in botany or ecology. C-L: Biology 218L, Botany 218L, and Marine Sciences. One and one-half courses or 6 units. *Evans, Peterson, and Wells (visiting summer faculty)*

219L. Marine Ecology. Factors that influence the distribution, abundance, and diversity of marine organisms. Course structure integrates lectures, field excursions, and independent research projects. Topics include characteristics of marine habitats, adaptation to environment, species interactions, biogeography, larval recruitment, rocky shores, marine mammals, fouling communities, tidal flats, beaches, subtidal communities, and coral reefs. Open to undergraduates only under Biology 129L. Four units (fall and spring); six units (summer). (Given at Beaufort.) Prerequisite: none; suggested—introductory ecology, invertebrate zoology, or marine botany. C-L: Marine Sciences and Zoology 203L. Variable credit. *Staff*

222L. Physical Processes in Coastal Environments. The physical processes on beaches, the inner continental shelf, and in estuaries, in the context of their implications for the biological and geological environments. Topics to be drawn from the origin of waves and currents, tides, turbulence and mixing transport of sand and larvae. Applications to biomechanics and coastal erosion, and to marine ecology, coastal zone management, and water quality. (Given at Beaufort.) Prerequisites: Mathematics 31 and 32. C-L: Geology 201L and Marine Sciences. One course or 4 units. *Howd*

223L. Behavioral Ecology. How ecological factors shape foraging, mating, aggressive, and social behavior. Laboratory experiments and field observations from the Outer Banks environment. Independent projects and seminars. Not open to undergraduates. (Given at Beaufort.) Prerequisite: introductory biology (Biology 25L). C-L: Marine Sciences and Zoology 213L. 6 units. *Rubenstein (visiting summer faculty)*

225L. Coastal Ecotoxicology and Pollution. Principles of transport, fates, food-web dynamics and biological effects of pollutants in the marine environment. Laboratory to stress standard techniques for assessing pollutant levels and effects. (Given at Beaufort.) Prerequisites: introductory chemistry and biology. C-L: Marine Sciences. One course or 4 units. *Kenney*

226. Marine Mammals. Ecology, social organization, behavior, acoustic communication, and management issues. Focused on marine mammals in the southeastern United States (for example, bottlenose dolphin, right whale, West Indian manatee). Only open to undergraduates under Biology 126. (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. 3 units. *Read or staff*

226L. Marine Mammals. Same as Environment 226 with laboratory. Laboratory exercises will consider social organization and acoustic communication in the local bottlenose dolphin population. (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. 4 units. *Read or staff*

228L. Physiology of Marine Animals. Environmental factors, biological rhythms, and behavioral adaptations in the comparative physiology of marine animals. Not open to undergraduates. Four units (fall); six units (summer). (Given at Beaufort.) Prerequisites: introductory biology and chemistry. C-L: Marine Sciences. Variable credit. *Forward*

229L. Biochemistry of Marine Animals. Functional, structural, and evolutionary relationships of biochemical processes of importance to marine organisms. Not open to undergraduates. Four units (fall and spring); six units (summer). (Given at Beaufort.) Prerequisite: Biology 25L; Chemistry 11L, 12L. C-L: Marine Sciences. Variable credit. *Rittschof*

243. Environmental Biochemistry. Introduction to the (macro)molecules of life and fundamental metabolic pathways. Topics are presented in the context of environmental perturbations. Fundamental aspects of energetics, proteins, enzymes, carbohydrates, lipids, and nucleic acids. Emphasis on mechanisms of adaptation, molecular controls, and responses to toxicants. (Given at Beaufort.) Prerequisite: organic chemistry. C-L: Cell Biology 243 and Marine Sciences. One course or 3 units. *C. Bonaventura*

244L. Molecular and Cellular Processes in Marine Organisms. Joint research projects on the adverse effects of environmental pollutants on marine organisms at the cellular and molecular level. Research methodologies include: spectroscopy (UV/VIS, fluorescence, and atomic absorption); subcellular fractionation; protein purification and characterization using chromatography and electrophoresis; analysis of pollutant-induced damage to proteins, membranes, and DNA; measurement of activity of enzymatic defense systems. Lectures cover molecular mechanisms of damage and damage control, and concepts that underlie the methods to be used. (Given at Beaufort.) Prerequisite: organic chemistry. C-L: Cell Biology 244L and Marine Sciences. One course or 4 units. *C. Bonaventura and McClellan-Green*

252L. Statistics and Data Analysis in Earth and Ocean Science. Techniques commonly used by earth and ocean scientists for the analysis of spatial and/or temporal series of data. Topics include regression, Fourier analysis, nonparametric spectral analysis, and, perhaps, principal components analysis and parametric spectral estimators. (Given at Beaufort.) Prerequisites: Mathematics 31 and 32, Statistics 110 or 112, or consent of instructor. C-L: Geology 222L and Marine Sciences. One course or 4 units. *Howd*

268. Advanced Topics in Nearshore Processes. Advanced treatment of fluid processes in the nearshore. Topics drawn from nonlinear wave theory, radiation stresses and their gradients, forced and free infragravity waves, and the origins of mean currents in the surf zone. Other topics following students' interests. (Given at Beaufort.) Prerequisite: Environment 290, Mathematics 111 or 114, or consent of instructor. C-L: Geology 204 and Marine Sciences. One course or 3 units. *Howd*

269S. Advanced Topics in Marine Ecology. Theoretical concepts from population, community, and evolutionary ecology will be linked to observations and experiments to enhance understanding of the structure and function of marine systems. Current topics in marine ecology (for example, marine food web dynamics, species interactions, life history strategies, fisheries ecology, conservation biology). Discussions will be based on readings from the primary literature with emphasis on developing critical and synthetic skills. Each student will prepare a research proposal in NSF format. May be repeated. (Given at Beaufort.) C-L: Marine Sciences. Half course or 2 units. *Crowder*

273. Marine Fisheries Policy. Principles, structure, and process of public policy-making for marine fisheries. Topics include local, regional, national, and international approaches to the management of marine fisheries. A social systems approach is used to analyze the biological, ecological, social, and economic aspects of the policy and management process. (Given at Beaufort.) C-L: Marine Sciences. One course or 3 units. *Orbach*

276. Marine Policy. Formal study of policy and policy-making concerning the coastal marine environment. History of specific marine-related organizations, legislation, and issues and their effects on local, regional, national, and international arenas.

Topics explored through use of theoretical and methodological perspectives, including political science, sociology, and economics. Consent of instructor required. (Given at Beaufort.) C-L: Marine Sciences and Public Policy Studies 197. One course or 3 units. *Orbach*

291. Geological Oceanography. The geology of ocean basins, including origin, bottom physiography, sediment distribution, and sedimentary processes. Not open to students who have taken Geology 206S. (Given at Beaufort.) C-L: Geology 205 and Marine Sciences. One course or 3 units. *Staff*

292L. Biological Oceanography. Physical, chemical, and biological processes of the oceans, emphasizing special adaptations for life in the sea and factors controlling distribution and abundance of organisms. Not open to undergraduates. Four units (spring); six units (summer). (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. Variable credit. *Ramus or staff*

293. Analysis of Ocean Ecosystems. The history, utility, and heuristic value of the ecosystem; ocean systems in the context of Odum's ecosystem concept; structure and function of the earth's major ecosystems. Not open to undergraduates. (Given at Beaufort.) Prerequisite: one year of biology, one year of chemistry, or consent of instructor. C-L: Marine Sciences. 3 units. *Barber*

295L. Marine Invertebrate Zoology. Structure, function, and development of invertebrates collected from estuarine and marine habitats. Not open to students who have taken Biology or Zoology 274L. Not open to undergraduates. Four units (fall); six units (summer). (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. Variable credit. *Kirby-Smith*

297L. Biology of Marine Invertebrates. Systematic survey of the principal marine invertebrate taxa, with emphasis on structure, function, behavior, and ecology. Field trips and independent projects. Not open to undergraduates who have taken Biology 176L. (Given at Beaufort.) Prerequisite: introductory biology (Biology 25L). C-L: Biology 274L, Marine Sciences, and Zoology 274L. One and one-half courses or 6 units. *Dimock (visiting summer faculty)*

298. Special Topics. Content to be determined each semester. May be repeated. Variable credit. *Staff*

299. Independent Studies and Projects. Directed readings or research at the graduate level to meet the needs of individual students. Consent of instructor required. Units to be arranged. Variable credit. *Staff*

398. Program Area Seminar. Required seminar in each program area. Students present master's project research. Pass/fail grading only. Variable credit. *Staff*

399. Master's Project. An applied study of a forestry or environmental management problem or a theoretical research effort. A seminar presentation of the objectives, methodology, and preliminary findings is required. A written (or other medium) report at the conclusion of the project is also required. Undertaken with the guidance of the student's adviser. Consent of instructor required. Pass/fail grading only. 4 to 6 units, to be arranged. Variable credit. *Staff*

COURSES CURRENTLY UNSCHEDULED

256S. Seminar in Ocean Sciences

267S. Conservation Biology of Marine Mammals

393. Professional Writing

Geology

191, 192. Independent Study. Directed reading or research. Open only to qualified juniors and seniors by consent of director of undergraduate studies and supervising instructor. One course each or 3 units each. *Staff*

195. Independent Study for Nonmajors. Open to qualified juniors and seniors upon approval of the departmental faculty. One course or 3 units. *Staff*

201L. Physical Processes in Coastal Environments. The physical processes on beaches, the inner continental shelf, and in estuaries, in the context of their implications for the biological and geological environments. Topics to be drawn from the origin of waves and currents, tides, turbulence and mixing transport of sand and larvae. Applications to biomechanics and coastal erosion, and to marine ecology, coastal zone management, and water quality. (Given at Beaufort.) Prerequisites: Mathematics 31 and 32. C-L: Environment 222L and Marine Sciences. One course or 4 units. *Howd*

202. Beach and Island Geological Processes. Processes affecting evolution of beaches and barrier islands with emphasis on the effect of constructions. Not open to students who have taken Geology 196. (Given at Beaufort on three weekends.) C-L: Marine Sciences. Half course or 2 units. *Pilkey*

204. Advanced Topics in Nearshore Processes. Advanced treatment of fluid processes in the nearshore. Topics drawn from nonlinear wave theory, radiation stresses and their gradients, forced and free infragravity waves, and the origins of mean currents in the surf zone. Other topics following students' interests. (Given at Beaufort.) Prerequisite: Environment 290, Mathematics 111 or 114, or consent of instructor. C-L: Environment 268 and Marine Sciences. One course or 3 units. *Howd*

205. Geological Oceanography. The geology of ocean basins, including origin, bottom physiography, sediment distribution, and sedimentary processes. Not open to students who have taken Geology 206S. (Given at Beaufort.) C-L: Environment 291 and Marine Sciences. One course or 3 units. *Staff*

222L. Statistics and Data Analysis in Earth and Ocean Science. Techniques commonly used by earth and ocean scientists for the analysis of spatial and/or temporal series of data. Topics include regression, Fourier analysis, nonparametric spectral analysis, and, perhaps, principal components analysis and parametric spectral estimators. (Given at Beaufort.) Prerequisites: Mathematics 31 and 32, Statistics 110 or 112, or consent of instructor. C-L: Environment 252L and Marine Sciences. One course or 4 units. *Howd*

371, 372. Advanced Topics in Geology. To meet the individual needs of graduate students for independent study in various environmental sedimentary fields. Variable credit. *Staff*

Public Policy Studies

197. Marine Policy. Formal study of policy and policy-making concerning the coastal marine environment. History of specific marine-related organizations, legislation, and issues and their effects on local, regional, national, and international arenas. Topics explored through use of theoretical and methodological perspectives, including political science, sociology, and economics. Consent of instructor required. (Given at Beaufort.) C-L: Environment 276 and Marine Sciences. One course or 3 units. *Orbach*

Zoology

203L. Marine Ecology. Factors that influence the distribution, abundance, and diversity of marine organisms. Course structure integrates lectures, field excursions, and

independent research projects. Topics include characteristics of marine habitats, adaptation to environment, species interactions, biogeography, larval recruitment, rocky shores, marine mammals, fouling communities, tidal flats, beaches, subtidal communities, and coral reefs. Four units (fall and spring); six units (summer). (Given at Beaufort.) Prerequisite: none: suggested—introductory ecology, invertebrate zoology, or marine botany. C-L: Environment 219L and Marine Sciences. Variable credit. *Staff*

213L. Behavioral Ecology. How ecological factors shape foraging, mating, aggressive, and social behavior. Laboratory experiments and field observations from the Outer Banks environment. Independent projects and seminars. (Given at Beaufort.) Prerequisite: introductory biology (Biology 25L). C-L: Environment 223L and Marine Sciences. 6 units. *Rubenstein (visiting summer faculty)*

274L. Biology of Marine Invertebrates. Systematic survey of the principal marine invertebrate taxa, with emphasis on structure, function, behavior, and ecology. Field trips and independent projects. Not open to undergraduates who have taken Biology 176L. (Given at Beaufort.) Prerequisite: introductory biology (Biology 25L). C-L: Environment 297L and Marine Sciences. 6 units. *Dimock (visiting summer faculty)*

295S, 296S. Seminar. Topics, instructors, and course credits announced each semester. Variable credit. *Staff*

353, 354. Research. To be carried on under the direction of the appropriate staff members. Hours and credit to be arranged. C-L: Marine Sciences. Variable credit. *Staff*

360, 361. Tutorials. An approved academic exercise, such as writing an essay or learning a research skill, carried out under the direction of the appropriate staff members. Hours and credit to be arranged. Variable credit. *Staff*

Duke University Nicholas School of the Environment
MARINE LABORATORY
APPLICATION FOR ENROLLMENT IN SEMESTER PROGRAMS

Please fill out completely; type or print.

Please specify: Spring Semester _____ year
Fall Semester _____ year

Date _____

1. Mr., Ms. _____
Last Name First Middle

2. Social Security number: _____

3. Date of birth: (month) _____ (Day) _____ (Year) _____

4. A. Current full mailing address:

Street or P.O. Box _____

City _____ State _____ Zip _____

Telephone number (including area code) _____

Electronic mailing address: _____

4. B. Permanent or home full mailing address:

Street or P.O. Box _____

City _____ State _____ Zip _____

Telephone number (including area code) _____

5. Name and full mailing address of parents or guardian:

Name _____ Relationship _____

Street or P.O. Box _____

City _____ State _____ Zip _____

Telephone number (including area code) _____

6. DUKE STUDENTS (only)

A. Trinity _____ Engineering _____ Other (specify) _____

B. Major _____

C. Class (e.g., junior, senior) at time of enrollment at Marine Laboratory (specify rising level) _____

D. Date of matriculation: Month _____ Year _____

Date of expected graduation: Month _____ Year _____

7. **NONDUKE STUDENTS** (Students from institutions other than Duke who are attending for the semester only and who will be classified as special, nondegree students)

A. Name and address of home institution: _____

City _____ State _____ Zip _____

B. Major _____

C. Class (e.g., junior, senior) at time of enrollment at Marine Laboratory (specify rising level): _____

D. Date of matriculation : Month _____ Year _____

Expected date of graduation: Month _____ Year _____

E. The following person has been requested to mail a letter of recommendation to the Admissions Office of the Duke University Nicholas School of the Environment, Marine Laboratory:

Name _____ Position _____

Institution _____

F. Transcript(s) will be sent by the following institution(s):

G. List courses currently in progress (which would not yet appear on a transcript):

H. Have you ever been placed on probation or suspended or dismissed from any school?

No _____ Yes _____ (If yes, please explain below.)

I. Have you previously attended Duke: No _____ Yes (Give dates): _____

Have you received a degree from Duke: No _____ Yes (Give dates): _____

Mail Application to:

Admissions Office

Duke University Nicholas School of the Environment

Marine Laboratory

135 Duke Marine Lab Road

Beaufort, North Carolina 28516-9721

Duke University Nicholas School of the Environment
MARINE LABORATORY
APPLICATION FOR ENROLLMENT IN SUMMER PROGRAM

Please fill out completely; type or print.

Date _____

Mr., Ms. _____

Last Name

First

Middle

Date of birth: (Month) _____ (Day) _____ (Year) _____

Social Security number: _____

Current full mailing address:

Street or P.O. Box _____

City _____ State _____ Zip _____

Telephone number (including area code) _____

Electronic mailing address: _____

Permanent or home full mailing address:

Street or P.O. Box _____

City _____ State _____ Zip _____

Telephone number (including area code) _____

Name and full mailing address of parents or guardian:

Name _____ Relationship _____

Street or P.O. Box _____

City _____ State _____ Zip _____

Telephone number (including area code) _____

DUKE STUDENTS:

Undergraduate: Trinity _____ Engineering _____ Other (specify) _____

Graduate: Graduate Sch. Arts & Sci. _____ School of the Environment _____

Other (please specify) _____

Class (e.g., junior, 1st yr. M.S.) at time of enrollment at Marine Laboratory (specify rising level): _____

Expected date of graduation _____

Major _____

NONDUKE STUDENTS (attending summer session only)

Unclassified: Prebaccalaureate _____ Class (e.g., junior) _____

Postbaccalaureate _____ Class (e.g., 1st yr. M.S.) _____

Major _____

Expected date of graduation _____

If currently attending, list name and address of school _____

Have you previously attended Duke: No _____ Yes (Give dates): _____

Have you received a degree from Duke: No _____ Yes (Give dates): _____

ALL STUDENTS (Applying to courses numbered 100 or higher):

List courses currently in progress (which would not yet appear on a transcript):

List other colleges and/or universities attended and degree(s) received:

EACH APPLICANT IS REQUIRED TO COMPLETE AND SUBMIT THIS APPLICATION FORM AND TRANSCRIPT(S) OF ACADEMIC WORK COMPLETED TO DATE TO THE ADMISSIONS OFFICE. NOTE: A maximum of one 6 graduate unit or 1 1/2 course program (6 semester hours) will be permitted per term (unless appropriate approval is obtained). FIRST AND SECOND COURSE CHOICES SHOULD BE INDICATED. LIST COURSE(S) DESIRED BELOW:

FIRST TERM:

Course Number	Course Title
1. _____	_____
2. _____	_____

SECOND TERM:

Course Number	Course Title
1. _____	_____
2. _____	_____

SUMMER TUITION SCHOLARSHIPS ARE AVAILABLE ON A COMPETITIVE BASIS. In addition to this completed application and current academic transcript(s), scholarship applicants must submit a letter of recommendation from academic faculty and a brief statement of purpose, i.e., the reason for taking the particular course. Preconditions for review of a scholarship/fellowship application are admission to a specific summer course and submission of the \$150 course deposit. All supporting scholarship credentials must be received by the Admissions Office of the Marine Laboratory no later than March 1. For additional information, see the section on Financial Assistance in this publication.

Please complete below:

Please consider me for a summer tuition scholarship: Yes _____ No _____

Mail Application to: Admissions Office, Duke University Nicholas School of the Environment,
Marine Laboratory, 135 Duke Marine Lab Road, Beaufort, North Carolina 28516-9721

Duke University
Nicholas School of the Environment
Marine Laboratory
135 Duke Marine Lab Road
Beaufort, NC 28516-9721

ADDRESS CORRECTION REQUESTED

1-2

Permit No. 25
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DUKE UNIVERSITY
BEAUFORT, NC 28516-9721
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